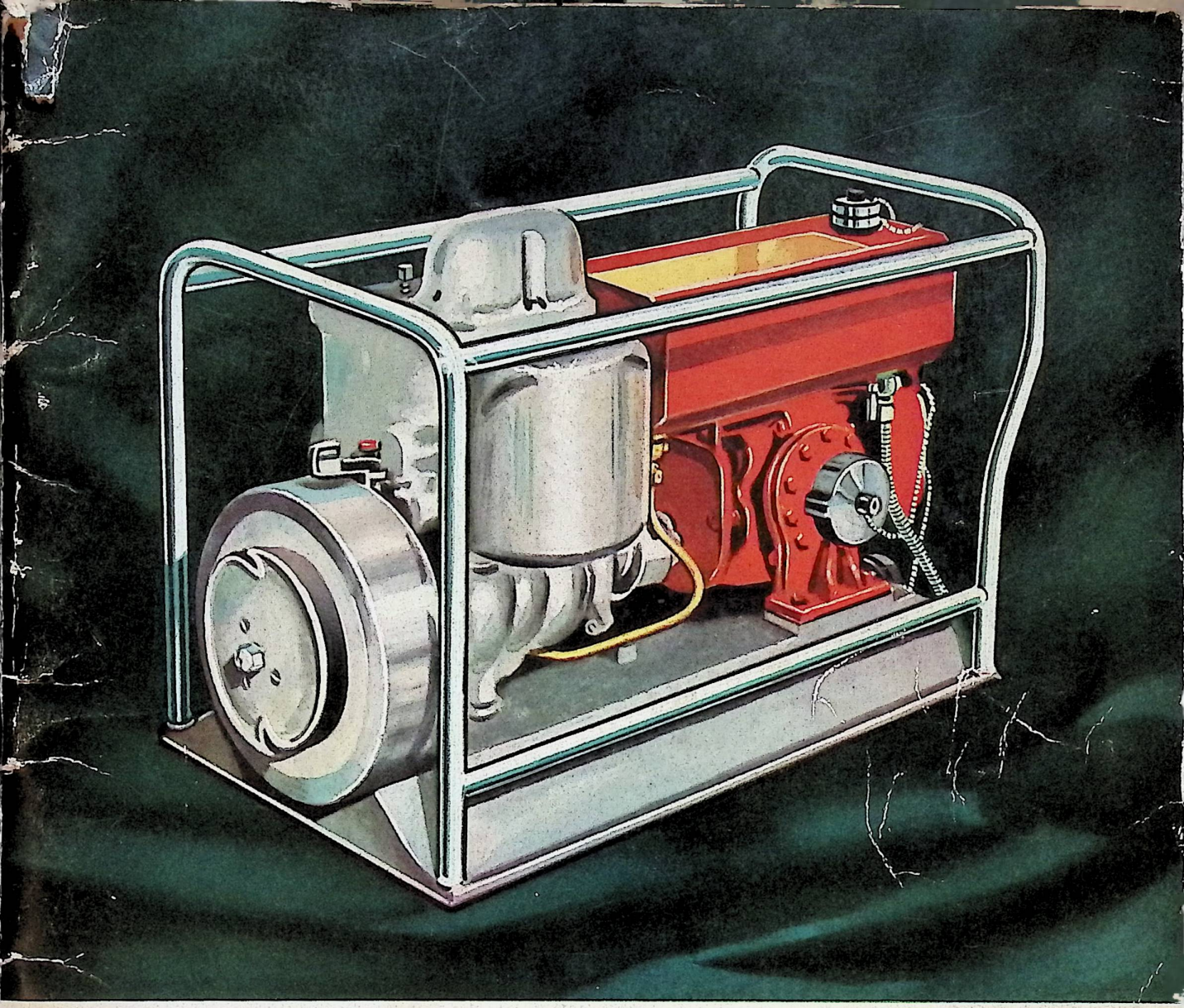

SERVICE MANUAL

Operating Instructions

PACIFIC PORTABLE PUMPERS

TYPE NY

PACIFIC MARINE SUPPLY COMPANY

SEATTLE

Section **1**

OPERATING INSTRUCTIONS

Section **2**

MAINTENANCE AND REPAIRS

Section **3**

REPAIR PARTS CATALOG

☆

SERVICE MANUAL AND OPERATING INSTRUCTIONS

PACIFIC PORTABLE PUMPERS—TYPE NY

PACIFIC MARINE SUPPLY COMPANY, SEATTLE, WASHINGTON

PREFACE

THE PREPARATION of this manual by the manufacturer has met with the approval of the U. S. Navy. The purpose of this manual is to acquaint personnel assigned to the use of the NY Pacific Portable Pumper with:

1. **THEORY OF OPERATION.**
2. **STARTING AND OPERATING THE UNIT.**
3. **CORRECTING MISADJUSTMENTS AND TROUBLES.**
4. **MAINTENANCE AND REPAIR.**
5. **PARTS LIST.**

This manual serves as an excellent text book for the instruction of personnel.

Section 1

OPERATING INSTRUCTIONS

Personnel assigned to the care and operation of this equipment should familiarize themselves thoroughly with the instructions and information contained in this section of the manual. Maximum results will be obtained from the equipment by carefully following these instructions and information.

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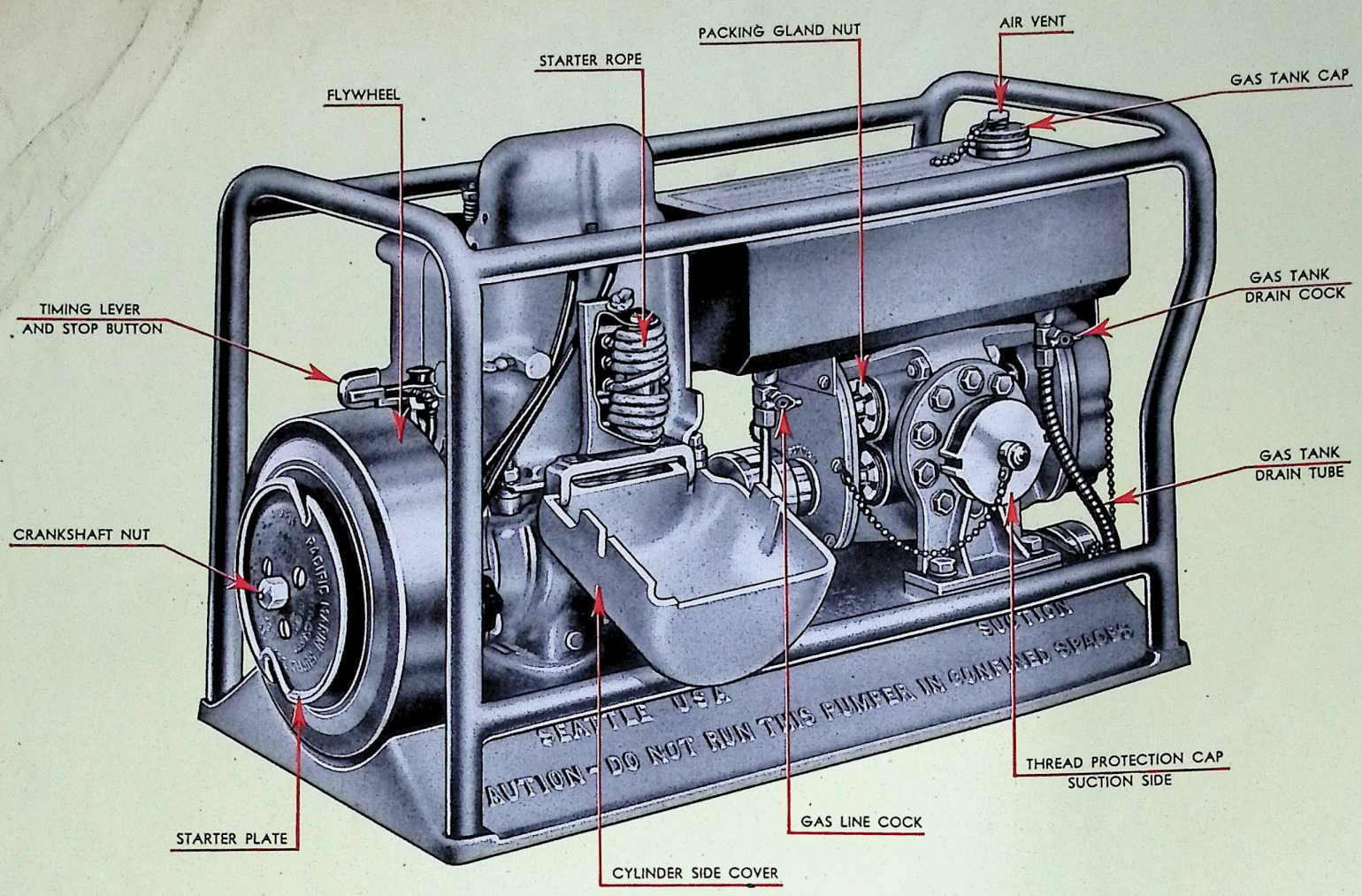
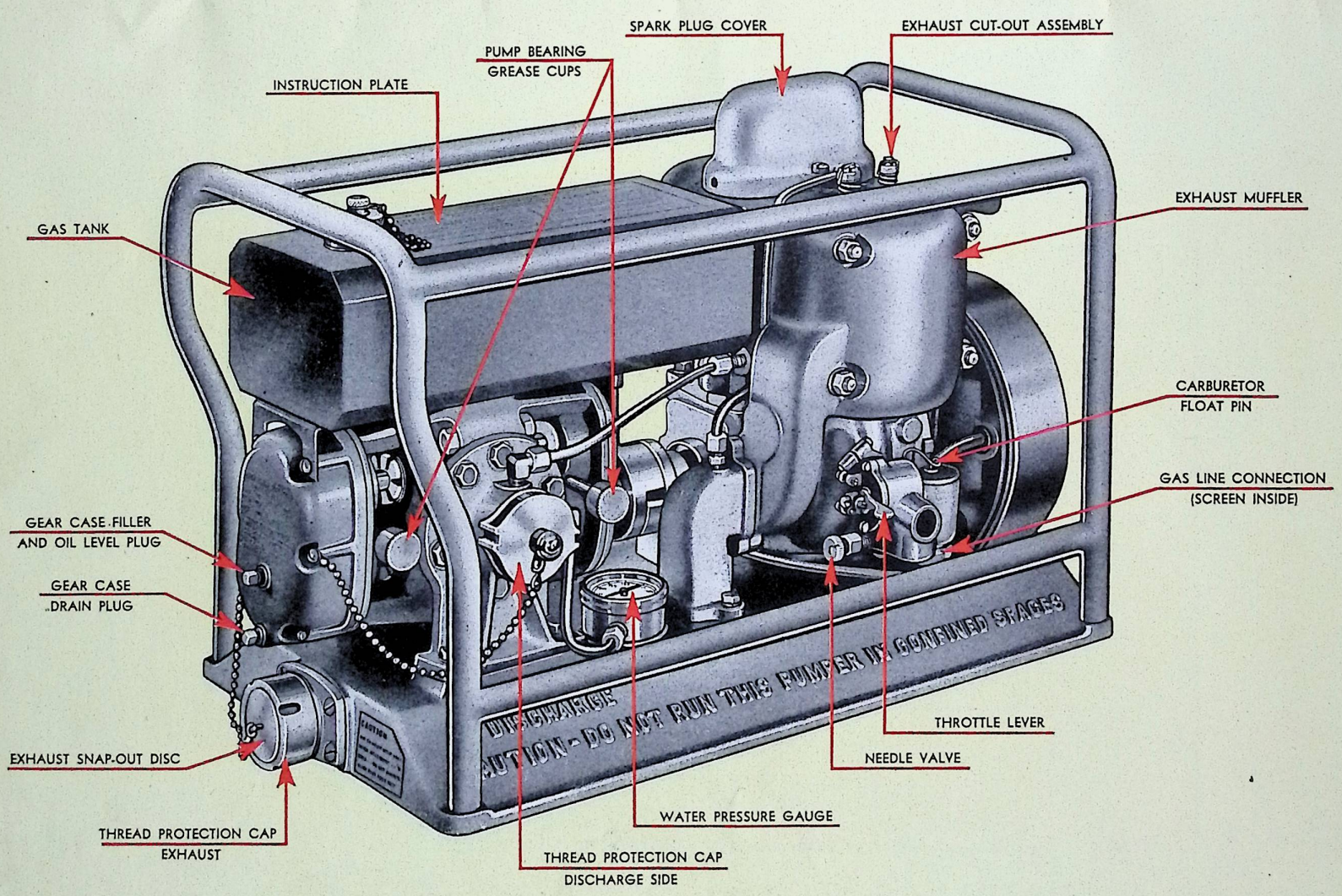
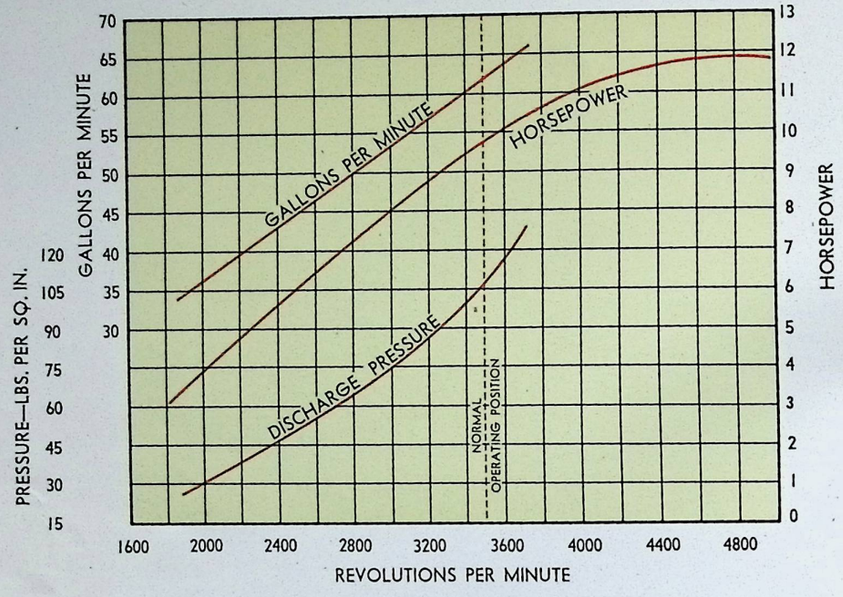


SUCTION SIDE OF PUMPER



DISCHARGE SIDE OF PUMPER

PUMPER CHARACTERISTIC PERFORMANCE CURVES



ENGINE

The NY pumper is powered by a precision built gasoline engine of the two cycle type, having alternate firing, vertical, parallel cylinders. The two cycle principle is fully described on the following page.

ENGINE DATA

Bore—2⅛ inches.

Stroke—1$\frac{31}{32}$ inches.

Piston displacement—13.96 cubic inches.

Brake horsepower—9.8 at 3500 R.P.M.

Clearance of Major Parts:

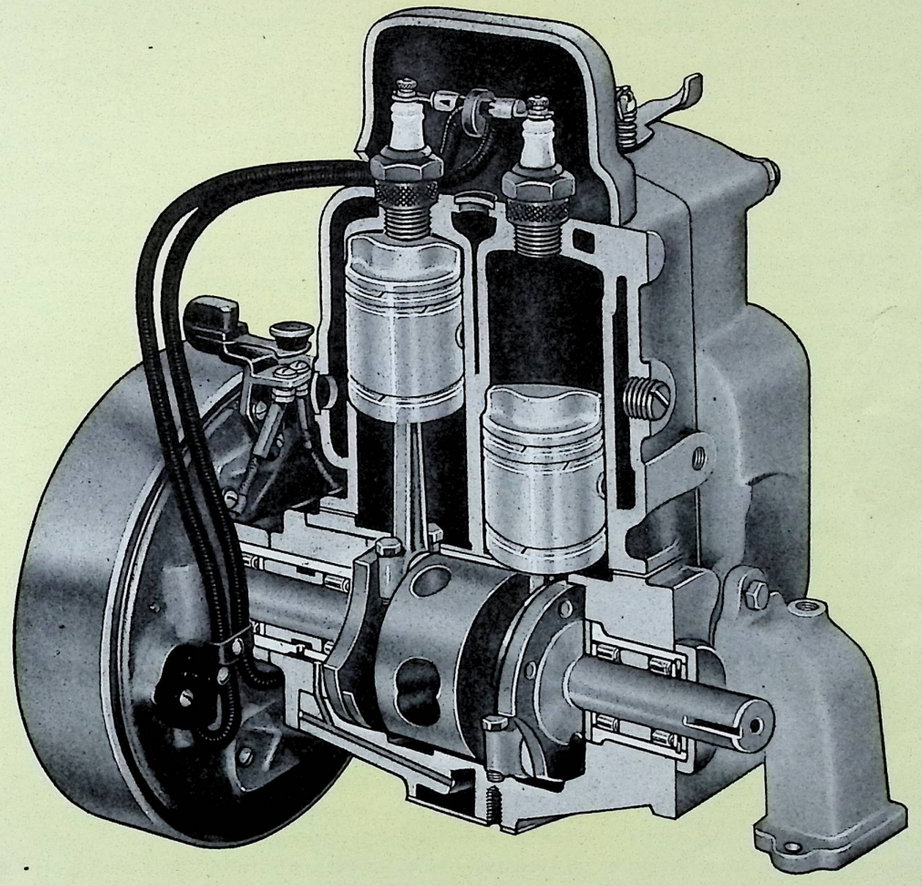
Piston—.00225" to .00375".

Crankshaft—Roller bearings.

Rotary valve—.005" maximum.

Pole pieces to coil heels—.015".

ENGINE



THE TWO-STROKE CYCLE PRINCIPLE

The two (stroke) cycle engine, such as used on all NY Pacific Pumpers, differs somewhat from the four (stroke) cycle automobile engine, this difference being due to the method of conducting gases to and from the cylinder while in operation. The two (stroke) cycle engine employs an arrangement of ports rather than mechanically operated valves to accomplish this purpose, as shown in the illustrations on the following pages.

ILLUSTRATION No. 1—On the first upward stroke of the piston a vacuum is created in the crankcase. As the piston progresses in its upward movement intake port "A" is uncovered, causing fuel vapor from the carburetor to flow into the crankcase "B." The crankcase is now fully charged.

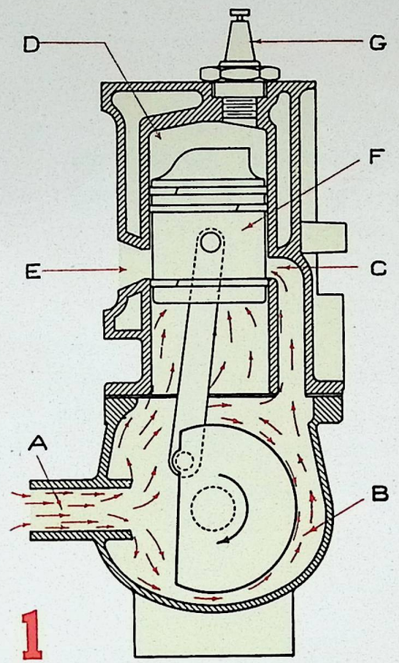
ILLUSTRATION No. 2—The piston on reaching the end of the stroke reverses its direction and begins a downward movement. Intake port "A" closes. On the continued downward movement of the piston the vapor charge in the crankcase is compressed until the piston nears the end of the stroke, when the by-pass port "C" is uncovered. This instantly releases the compressed crankcase charge, which flows through the by-pass and into the cylinder "D"—being directed upward by the piston deflector provided for this purpose.

ILLUSTRATION No. 3—On the following upward stroke, the vapor now having been transferred to the cylinder is compressed and prepared for ignition. However, during this period a second charge has been drawn into the crankcase through intake port "A." There are now two charges—one compressed in cylinder "D" and the charge in the crankcase.

ILLUSTRATION No. 4—At the end of the compression stroke, a spark, created by the magneto, jumps the gap between the points of spark plug "G"—igniting the compressed fuel vapor in cylinder "D." The vapor in burning expands rapidly, forces piston "F" downward to deliver power required to turn the crankshaft. Power, however, is not delivered through the entire length of the stroke, some time is required to rid the cylinder of burned gases and to receive a fresh charge from the crankcase for the succeeding power impulse.

As the piston travels downward on its power stroke, the fresh charge previously drawn into the crankcase is being compressed—Illustration No. 2.

Notice width of exhaust port "E" and by-pass port "C"—"E" is considerably wider than "C," therefore, piston "F" on nearing the end of its stroke uncovers the exhaust port somewhat earlier than it uncovers the by-pass port. A comparatively high pressure exists within the cylinder at this time, consequently, at partial uncovering of the exhaust port "E," the burned gasses commence to flow out through the exhaust port. Further travel of the piston uncovers by-pass port "C." The compressed vapor charge now in the crankcase is instantly released, flowing through the by-pass port into the cylinder and directed by the deflector. The incoming fresh charge continues to force the burned gases out of the cylinder through the exhaust port and into the atmosphere to complete the cycle.



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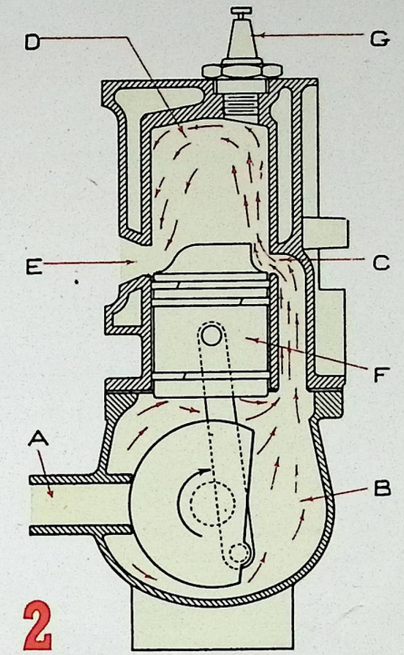

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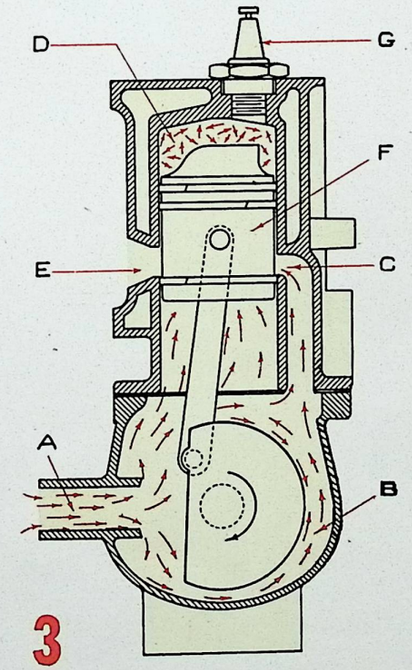

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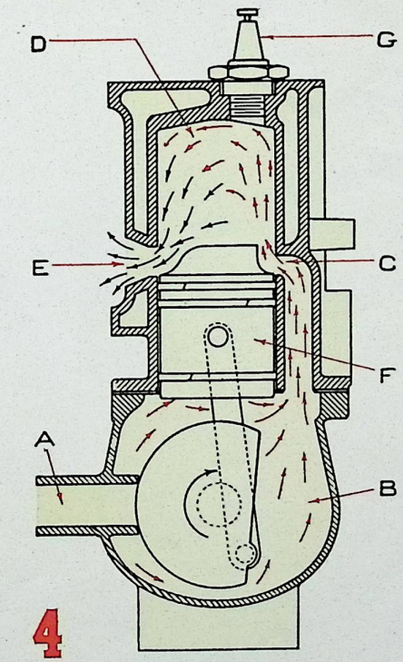
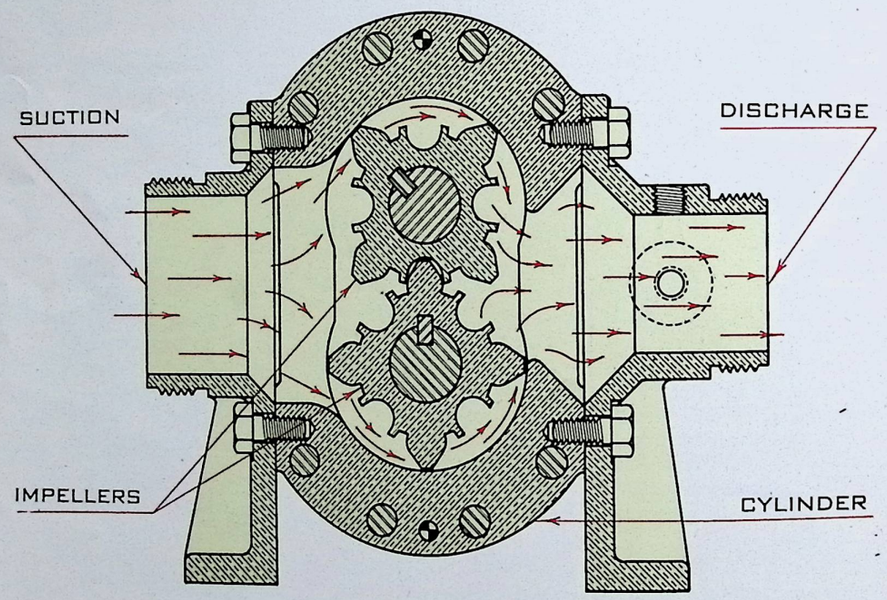


4

PUMP

The NY Pump is a precision built, positive displacement, rotary pump, suitably designed for salt water use. Two impellers create the water driving force. These impellers are synchronized by two pilot gears mounted on the ends of the shafts. The pilot gears turn in a case of oil. The action of the impellers produces a vacuum which draws the water into the suction side of the pump. From here it is carried between the teeth of the impellers and the cylinder to the opposite side of the pump where the impeller teeth mesh, forcing the water into the discharge hose. This action of a rotary pump is known as "positive displacement"—water, drawn into the pump, must be discharged as the impellers mesh.

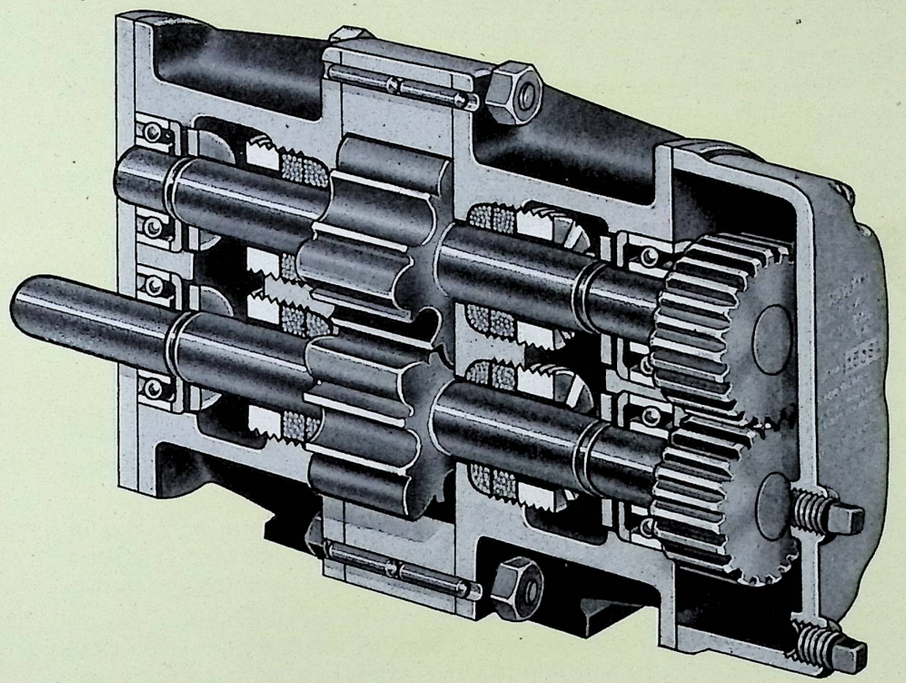


PUMP DATA

Type—Positive displacement, rotary.
Delivery—60 gallons per minute at 100 pounds pressure at 3500 R.P.M.

Clearances:
Impeller to cylinder—.004".
Impeller to end plate (each side)—.0015".

PUMP



PREPARING PUMPER TO OPERATE

EXHAUST

EXHAUST HOSE UNNECESSARY: If exhaust hose is not necessary merely pull snap-out disc from exhaust thread protection cap.

EXHAUST HOSE ATTACHED: To operate pumper in a confined space attach exhaust hose and direct dangerous carbon monoxide fumes to the outside. Pumper exhaust and cooling water can be discharged satisfactorily to an elevation of twenty feet above the pumper. When exhaust hose is elevated and the pumper is stopped, immediately disconnect the exhaust hose from the pumper. This is very important as water in the exhaust hose as well as water in the discharge hose will fill the base and then flow into the engine through the exhaust ports making the engine inoperative. The water in the discharge hose flows back through the cooling water circulating system to fill the base.

For additional information on below deck operations consult U. S. Navy Dept., Bureau of Ships, Washington, D. C.

SUCTION

ATTACH SUCTION HOSE: Remove thread protection cap from suction side of pump and attach suction hose.

GASKETS: Use gaskets of proper size. This will prevent air from being drawn into the suction through a poor connection.

SUCTION STRAINER: Never fail to attach the suction strainer to the lower end of the suction hose when drawing water from over side or from flooded compartments. Be sure the suction strainer is always completely submerged.

SUPPORT SUCTION HOSE: When drawing water from over side or from compartments, support the suction hose by securing it with a line so that the weight of the hose is not borne entirely by the pump.

SUCTION LIFT: The maximum suction lift which should be attempted with the pumper is twenty feet. When the pumper is used to take water from over side and the suction lift is too great to permit operation from the deck, lower the pumper and a man to operate it over the side in some suitable rigging.

PUMP LUBRICATION

GEARS: Fill Pilot Gear Case of pump to oil level of upper plug in gear case with good grade of SAE 30 oil if available. In emergency any good lubricating oil will serve.

BEARINGS: Fill Pump Bearing Grease Cups with light cup grease and turn down. Turn Grease Cups three full turns every ten hours of operation.

IMPELLERS: Always squirt lubricating oil liberally over pump impellers through the discharge side of the pump before starting the engine. This pump is a high speed rotary type and should always be lubricated before starting.

PACKING: Fill pump packing grease cups with medium weight grease, water-proof grease preferred. Turn grease cups down one full turn every four hours of operation.

FUEL MIXTURE

GASOLINE: Any available type of gasoline, "white," unleaded, preferred, although 100 octane is entirely satisfactory.

OIL: Navy Symbol No. 2190 (SAE 30) preferred.

MIXTURE: Mix in a separate container (other than gas tank) oil and gasoline in the following proportions:

1 PINT OIL TO 1 GALLON GASOLINE

Shake thoroughly to insure uniform mixture before pouring in gas tank. One tank of fuel mixture will operate engine for 45 minutes.

LUBRICATION: All engine lubrication is in the fuel and is obtained as the mixture of oil and gasoline enters the crankcase and is later transferred to the cylinders. Oil being less volatile than gasoline, a larger portion of the fuel-oil mixture remains in the crankcase to lubricate the bearings and other moving parts. The remainder enters the cylinder with the pre-compressed charge to aid in the lubrication of piston and piston rings.

CAUTIONS

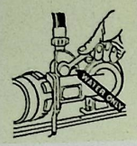
COOLING WATER: Do not operate the pumper without pumping, as the engine depends on water taken from the pump for cooling.

CONTROL R. P. M. WITH NOZZLE: A nozzle with an outlet of not more than 5/8 inch should always be attached directly to the discharge side of the pump or to the discharge end of the hose line. A nozzle of this size will hold the rotative speed of the unit to a proper R. P. M. Without any nozzle, but with open hose discharge, the pumper will speed to seven thousand or eight thousand R. P. M., which will seriously damage the unit.

MOVING SUCTION HOSE: In an emergency, the unit can be used as a bilge pump. When so used, care must be taken to shut off the pumper as soon as the water is removed from one compartment. Under no circumstances should the suction hose be moved from one compartment to another without stopping the pumper.

PUMP CLEAR WATER: Only in extreme emergency should water be pumped from a debris filled area as foreign material is likely to be drawn into the pump with damaging results.

STARTING INSTRUCTIONS

1 

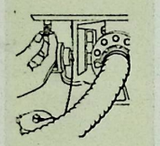
SET VALVE on Foam Proportioner in "Prime or Water Only" position.

2

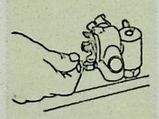
FILL TANK on pumper with properly mixed fuel.

3

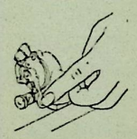
OPEN AIR VENT, small knurled cap on top of Gas Tank Filler Cap. Turn left to open.

4 

OPEN GAS TANK COCK under engine end of Gas Tank.

5 

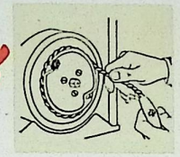
OPEN CARBURETOR NEEDLE VALVE two full turns from closed position. Needle Valve opens in a counter-clockwise direction (to the left).

6 

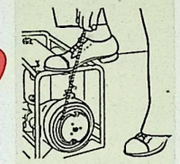
MOVE CARBURETOR THROTTLE LEVER DOWN to position marked "C" (Choke)—on the Carburetor Lever Quadrant.

7

FLOOD CARBURETOR by holding down Float Pin which projects through the cover of Carburetor Float Bowl. HOLD THIS PIN DOWN UNTIL FUEL OVERFLOWS.

8 

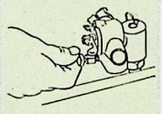
STARTING CORD: This is located in holder inside Cylinder Side Cover on the right side of engine facing the Flywheel. Place knotted end of cord in notch in Starter Plate. Wrap cord around Starter Plate two full turns.

9 

STARTING: Place foot on rail of pump and pull smartly on Starting Cord. Engine should start on two or three attempts (repeating Operation 8 and 9 and also flooding Carburetor again).

10

WHEN ENGINE STARTS IMMEDIATELY raise Carburetor Lever to horizontal position "F" (Fast), marked on Carburetor Lever Quadrant.

11 

ADJUST NEEDLE VALVE, closing it approximately one complete turn to right (clockwise). This will vary in individual engines; try turning it both to the right and to the left slowly until the engine runs most smoothly. After the engine has run a few minutes, check this adjustment again, balancing if necessary; otherwise leave alone.

NOTE: When Carburetor Needle Valve is properly set, the hand on the Water Pressure Gauge will stop oscillating and hold a steady position.

12

TO STOP ENGINE press down on Stop Button (red button on Timing Lever). Hold button down until engine stops turning.

TO START A WARM ENGINE, proceed with Operations 7, 8 and 9, making no adjustment on Needle Valve. Use Choke Lever if necessary.

IF YOU FLOOD A WARM ENGINE, shut off Needle Valve on Carburetor, spin four or five times with Starting Cord. If engine starts let it run until it stops and then open Needle Valve to original running position. This is approximately one turn from a closed position. Start engine again following operations 7, 8 and 9.

MECHANICAL FOAM

MECHANICAL FOAM is used to extinguish certain types of fires. It possesses cohesive and adhesive qualities necessary to create a tough, free-flowing blanket that will eliminate oxygen from a fire and prevent the escaping vapors. This mechanical foam is produced by the proper mixture of foam liquid, water and air.

When foam is produced in conjunction with the type NY Pumper the proper amount of foam liquid is introduced into the water stream by one of two methods. Method No. 1 is by the use of an "S" type suction proportioner which is attached to the suction side of the pump. The foam liquid is then introduced into the water stream at the pumper. Method No. 2 is by the use of a suction proportioner that is built into the foam forming nozzle. By this method foam liquid is mixed with the water at the nozzle. Foam liquid introduced at the pumper or at the nozzle is equally effective.

Air is mixed with the water and foam liquid to produce the mechanical foam by means of the mechanical foam forming nozzle. This foam nozzle must be used for the production of foam regardless of which method is used to introduce foam liquid into the water stream.

When foam liquid is supplied at the pumper the pick-up tube at the nozzle performs no function and may be removed or disregarded. The nozzle is constructed to bend for convenience in directing the foam stream through hatchways or small openings. An adjustable chain is attached to hold the nozzle in this bent position.

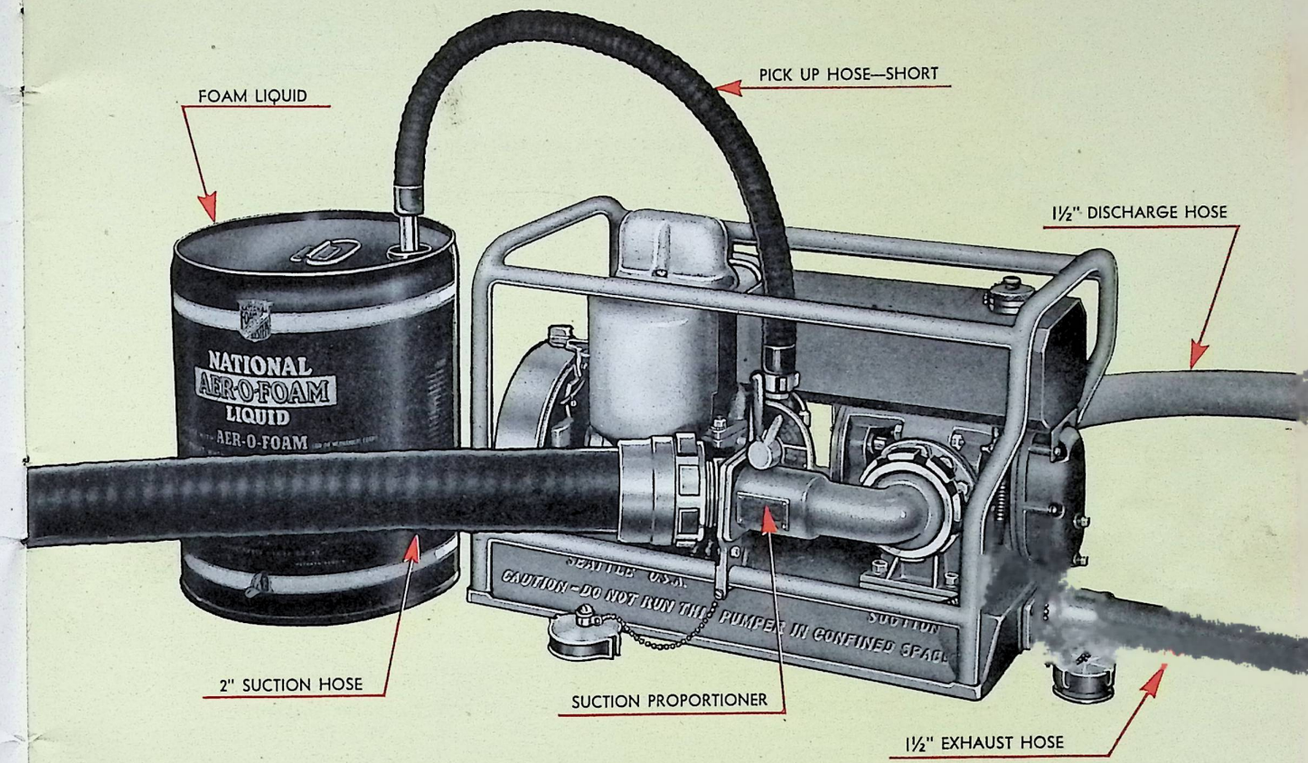
When foam liquid is supplied at the nozzle the pick-up tube and the proportioner at the pumper perform no function, however, the valve on the proportioner must be closed with pointer at "Prime or Water Only" position. IT IS IMPORTANT that the valve on the "S" type suction proportioner always be closed in the "Prime or Water Only" position when the pumper is running except when foam liquid is actually passing through it.

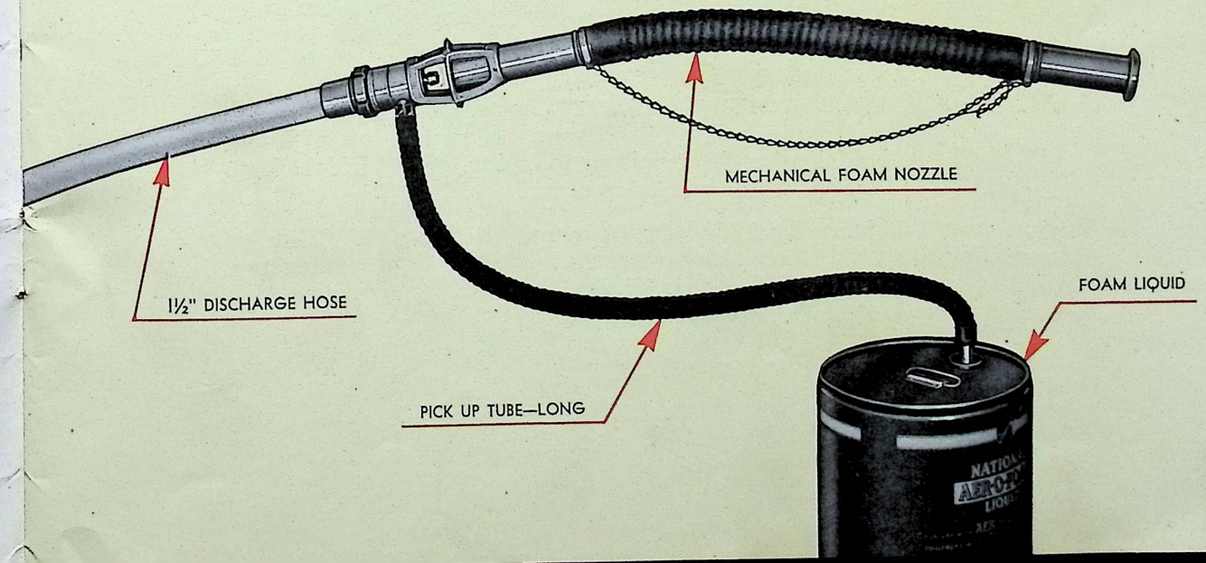
The "S" type suction proportioner may be left attached to the NY Pumper at all times whether pumper is used for the production of mechanical foam or for the pumping of water only.

Foam should be applied as gently as possible to the burning surface in order to avoid undue submergence which not only stirs the fire to greater intensity but also lessens the effectiveness of the foam. In many cases it is desirable to direct the foam stream against a solid surface from which it may flow to the liquid surface.

Mechanical foam may be made with either salt or fresh water.

FOAM EQUIPMENT

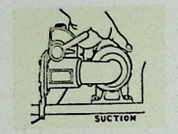




FOAM GENERATING INSTRUCTIONS

METHOD NO. 1

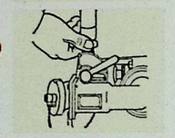
By Method No. 1 the suction proportioner introduces foam liquid into the water stream on the suction side of the pump to form a solution for delivery to the mechanical foam nozzle.



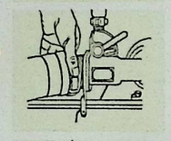
1

BEFORE STARTING PUMPER:

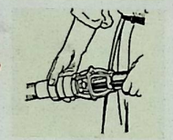
ATTACH "S" TYPE SUCTION PROPORTIONER securely to suction side of NY Pumper.



2 Screw pick-up tube into connection on suction proportioner.

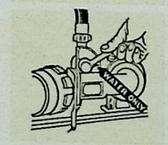


3 ATTACH 2" SUCTION HOSE with suction strainer attached to suction proportioner. All connections on suction side of the pump must be tight so that air is not drawn into the suction.



4 ATTACH MECHANICAL FOAM FORMING NOZZLE to discharge end of 1½" discharge hose.

5 Insert pick-up tube, attached to suction proportioner, in can of foam liquid so that tube reaches the bottom.



6 CLOSE VALVE ON SUCTION PROPORTIONER by turning pointer to "Prime or Water Only" position.

START PUMPER:

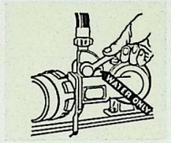
7 WHEN WATER PRESSURE, as indicated by the gauge on the pumper, is 100 lbs. or more, turn valve to "Foam Position" and set pointer to estimated lift in feet from level of water supply to pump.

When first can of foam liquid is nearly empty, turn valve to "Prime or Water Only" position, insert pick-up tube in full can of liquid and return valve to "Foam Position." This procedure avoids sucking air which may cause the pump to lose its prime.

FOAM GENERATING INSTRUCTIONS

METHOD NO. 2

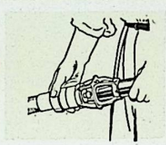
By Method No. 2 the foam liquid is mixed with the water at the nozzle by means of the suction proportioner that is built into the mechanical foam forming nozzle.



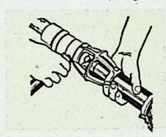
1

BEFORE STARTING PUMPER:

SET UP PUMPER FOR PUMPING WATER. If "S" type suction proportioner is attached to pump, set and leave valve with pointer in "Prime or Water Only" position.

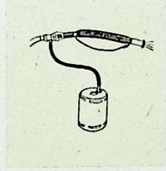


2 ATTACH MECHANICAL FOAM NOZZLE to discharge end of the 1½" discharge hose.



3 SCREW PICK-UP TUBE INTO CONNECTION at base of nozzle.

START PUMPER:



4 WHEN WATER PRESSURE, as indicated by the gauge on the pumper, is 100 lbs. or more, insert loose end of pick-up tube into can of foam liquid so that tube reaches the bottom. When the first can is empty, quickly transfer the pick-up tube into another full can of foam liquid.

FOAM EQUIPMENT DATA

CAPACITY: When foam is produced in conjunction with the type NY Pumper approximately 3.6 gallons of foam liquid mixes with approximately 56 gallons of water to form 540 to 600 gallons of mechanical foam per minute. A five gallon can of foam liquid lasts approximately 1½ minutes.

ITEM	WEIGHT	OVER-ALL DIMENSIONS
SP-1 Proportioner	10½ lbs.	10¼" x 7¼" x 4"
SP-1 Pick-up tube—short	2¼ lbs.	1½" x 1½" x 48"
NPU Nozzle	8¾ lbs.	4" D x 44"
NPU Pick-up tube—long	2¾ lbs.	1½" x 1½" x 60"

AFTER USE ALL PARTS SHOULD BE THOROUGHLY FLUSHED WITH WATER and the strainers examined to see that they are clean.

HARD STARTING

TEST FOR GASOLINE

To determine whether gasoline has been sucked into the cylinder, remove the spark plug. If the plug is dry, check the following:

1. Fuel supply in gas tank.
2. Vent valve in tank cap—must be open.
3. Fuel line cock under tank—must be open.
4. Fuel line from cock to carburetor.
5. Screen in carburetor.
6. Carburetor needle valve—must be open.

IMPROPERLY MIXED FUEL OF GASOLINE AND OIL CAN CAUSE HARD STARTING.

TEST FOR SPARK

To test for spark, remove the spark plug high tension wire and hold within ⅛" of the side of the motor and spin the flywheel. If there is no spark it may be due to a damaged coil, blown condenser, a short circuit or breakdown in insulation, or the contact points may be pitted or out of adjustment. The correct clearance of the contact points is .025".

SPARK PLUGS

To test spark plugs, lay plugs with the wires attached on cylinder and spin flywheel. If there is no spark, it can be due to:

1. Fouling caused by an accumulation of unburned oil and carbon or a drop of water between the points.
2. Burned off points.
3. Cracked porcelain.

The correct gap clearance of spark plug points is .025".

Don't waste time with spark plugs in questionable condition—install new ones. The pumper is factory equipped with Champion No. 13 plugs, however, any 18 mm. spark plug will serve. (Firestone No. M60, Edison No. X20, A. C. No. 83, Bosch No. S105, Defiance No. 44, Autolite No. B-5, etc.)

FAILURE TO PRIME

If the pumper runs but fails to pump water, it may be due to one of the following conditions:

1. Too great a suction lift. The maximum suction lift to be attempted should not exceed 20 feet.
2. Worn condition of pump impellers and pump cylinder. If this worn condition is not too serious, the pump can be primed by saturating the impellers with oil. The oil causes a seal between impellers and cylinder. In this condition the pump is inefficient and should be repaired as soon as possible.
3. Air intake in suction caused by:
   a. Strainer not completely submerged.
   b. Hose connections not tight.
   c. Proportioner valve not set in "Primer or Water Only" position.

RATED PERFORMANCE

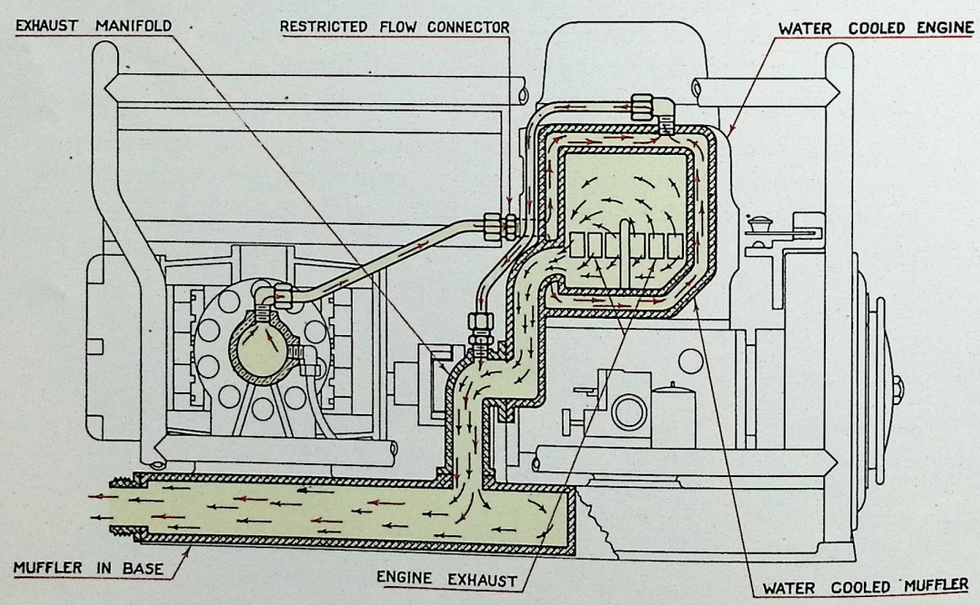
Under ordinary conditions it will not be necessary to make field repairs if the equipment is treated as fire apparatus and carefully checked for performance at regular intervals. After the pumper has been operated for some time, a slight adjustment may be necessary to bring the pumper back to rated performance.

This is accomplished by loosening clamp screw on armature plate and advancing timing lever slightly against engine rotation. After adjustment, tighten clamp screw only enough to hold in set position.

COOLING WATER CIRCULATION

The engine and muffler are cooled by water taken from the discharge side of the pump. The water, being under pressure, is forced through a tube to the engine where it passes through a Restricted Flow Connector. This connector allows the required amount of water to pass into the engine where it cools the engine cylinder and muffler. After circulating around the engine and muffler the water passes through an elbow connection at the top of the engine and through a tube to the exhaust manifold. Here the water mixes with and cools the engine exhaust. The water and exhaust pass together through the expansion chamber, or muffler in base, and out the exhaust hose fitting at the pump end of the base.

Because the engine depends upon water taken from the pump for cooling, the pumper should not be operated unless it is pumping water. Be sure water is being discharged with the exhaust when pumper is in operation. If no water is being discharged, stop pumper immediately and determine cause. Check the Restricted Flow Connector first as this part, having the smallest orifice of any part of the circulating system, is most apt to become clogged.



CARE OF PUMPER

DRAIN FUEL TANK

As a precaution, completely drain fuel tank after use. If possible, keep on hand for emergency use, 5 gallons of properly prepared fuel mixture.

FLUSH COOLING SYSTEM

After pumping salt water the cooling water circulating system should be flushed with fresh water. This can be accomplished by operating unit in fresh water for a few minutes. If fresh water is not abundant, attach the exhaust hose to the discharge side of the pump when pumper is not running and when thread protection cap is in place on suction side of pump, fill this hose with fresh water from a bucket, and elevate hose above the pumper. The fresh water will flow through the tubes, etc., and flush the salt water from the circulating system.

CHECK IGNITION

Inspect spark plugs. Clean, and if necessary, adjust gap of points. (Correct setting of gap is .025".) Inspect breaker points. If breaker points require adjustment, do so as instructed in Maintenance and Repair Section.

INSPECT FUEL SYSTEM

Remove and clean screen from gas line nut connection at base of carburetor and be sure the gas line is free from dirt.

EXAMINE FLYWHEEL NUT

Be sure flywheel nut is secure. A loose flywheel nut can be the cause of extensive repairs if not tightened immediately.

REPLACE STARTER ROPE

Make certain the starter rope is replaced in its proper position.

WIPE AND LUBRICATE

Wipe complete unit with oily rag. Squirt oil liberally over pump impellers, and replace thread protection caps. Check oil level of pump gear case, filling same to proper level. Pack grease cups on pump and turn down. Remove each spark plug and squirt small quantity of oil into each cylinder. Turn engine several times to thoroughly lubricate cylinder walls.

The operator using the pumper last, knows best what attention the pumper should have before stowing away. Proper attention at this time means quick starting and satisfactory operation when the next emergency arises.

DIMENSIONS AND WEIGHTS

FOR SHIPMENT AND STOWAGE

OVER-ALL DIMENSIONS

Pumper unit only	24⅝" x 12⅛" x 15 3/16"
Pumper unit with suction proportioner and pick-up tube attached	24⅝" x 13" x 18½"
Suction strainer	6¾" x 4¾" diameter
Suction hose (2 pieces) each	10' x 4" diameter
Exhaust hose (1 piece)	10' x 2¾" diameter
Spare parts box	12½" x 6¼" x 6¾"
Foam equipment	See page 19
Packing box for pumper, strainer, spare parts box and foam equipment	36" x 15½" x 20¾"
Packing box suction and exhaust hose	37" x 10½" x 36"

WEIGHTS

Pumper unit only	93 pounds
Suction strainer	6 pounds
Spare parts and box	20 pounds
Foam equipment	24 pounds
Packing box for above	62 pounds
TOTAL	205 pounds
Suction hose (2 pcs.) total	59 pounds
Exhaust hose	8 pounds
Packing box for above	33 pounds
TOTAL	100 pounds

Section 2

MAINTENANCE AND REPAIR

Personnel assigned to maintenance of this equipment will find in this section instructions and information for its disassembly, repair and reassembly. Satisfactory results should be obtained by following these instructions.

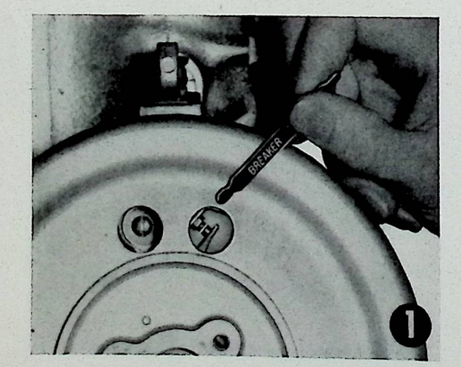
INDEX TO MAINTENANCE SECTION

Cleaning and adjusting of breaker points	26
Removal and installation of flywheel	26-28
Removal and installation of armature plate	28
Installation of breaker points	28
Installation of a condenser	28
Installation of an ignition coil	29
Removal and installation of piston rings	30-32
Removal and installation of connecting rods	32-33
Removal and installation of pistons	33-34
Removal and installation of crankshaft in crankcase	34-36
Disassembly and cleaning of carburetor	37
Disassembly of pump	38
Reassembly of pump	40-42

MAGNETO

TO CLEAN AND ADJUST BREAKER POINTS. Remove starter plate that is held in position by three screws. Next, remove the inspection hole cover, the large ring under the starter plate. Ports or openings in the flywheel make points accessible for inspection, cleaning, adjusting, etc. *(figure 1)*. Spread breaker points with blunt instrument to observe their condition. If found to be pitted or corroded, place a narrow strip of 00 sandpaper between the points, folded in such a manner that both points can be dressed down simultaneously by drawing back and forth between them. (Do not use emery cloth.)

Upon completion of this operation, it is well to check the gap between the points. This can be accomplished by turning the flywheel slowly until the points are wide apart. Insert feeler gauge between points. Correct setting is .025" (full open). Note breaker arm, breaker plate and breaker point adjusting screw *(figure 3)*, and breaker point cam in flywheel *(figure 3)*. If necessary to reset breaker points, loosen breaker point adjusting screw—note arm is free to move slightly.



Since the breaker points are actually operated by the cam in the flywheel, breaker plate must be adjusted to a definite position with respect to the cam to obtain proper gap setting at points. Insert screwdriver or other blunt instrument through port in flywheel, shift position of breaker plate as required to attain .025" gap. To increase gap, shift breaker plate and arm assembly towards cam (center of flywheel); to decrease gap shift from cam. Tighten set screw to lock in position at proper gap setting.

Note mark on rim of flywheel and a similar mark on armature plate (engine side)—points should be on verge of opening when two marks index.

Replace inspection hole cover and starter plate.

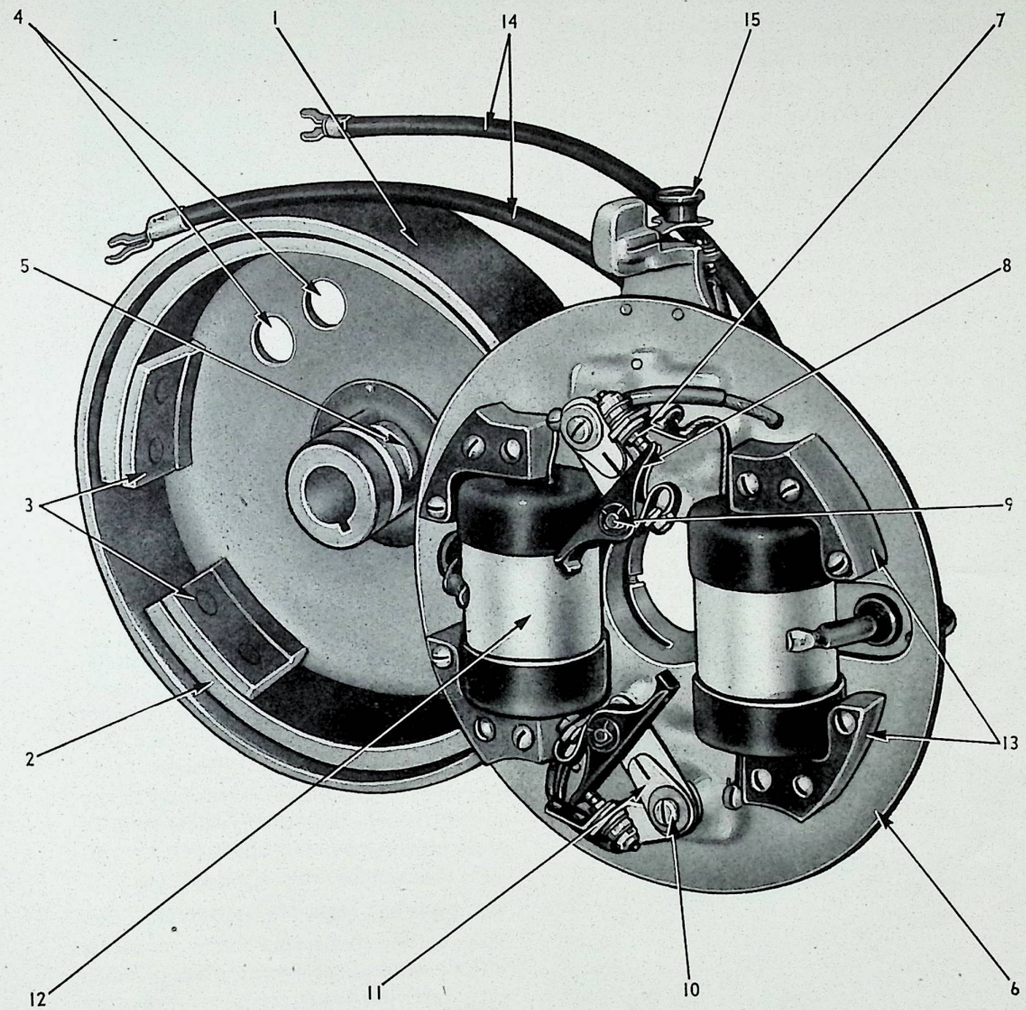
To install new breaker points, flywheel and armature plate must be removed.

TO REMOVE FLYWHEEL. The flywheel nut and starter plate act in combination as a puller when unscrewing the flywheel nut. The nut is provided with a shoulder and bears against flywheel side of starter plate. Use a strap wrench on the flywheel to prevent the flywheel from turning. If no strap wrench is available, one man should hold the flywheel with his hands while another loosens the nut. Unscrew flywheel nut until it tightens against starter plate. Use socket with "L" handle or large crescent wrench. If necessary, strike handle of wrench a sharp blow with hammer or mallet. This will jar flywheel loose from taper on the crankshaft.

Pull flywheel from crankshaft.

MAGNETO ASSEMBLY

FIGURE 3



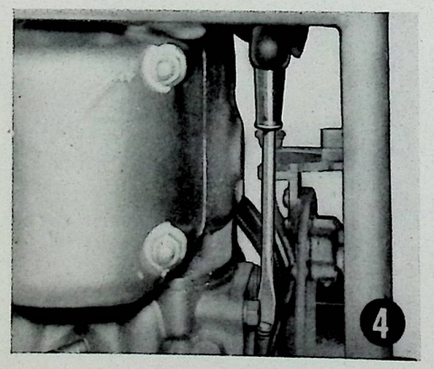
PARTS

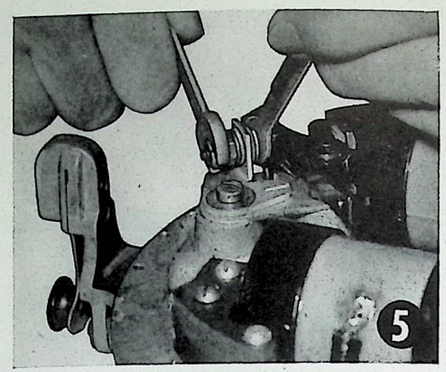
1. Flywheel
2. Magnet
3. Pole pieces
4. Inspection holes
5. Cam
6. Armature plate
7. Contact point and screw
8. Breaker arm and spring
9. Breaker post
10. Adjusting screw
11. Adjusting cam
12. Ignition coil
13. Coil heels
14. Spark plug leads
15. Stop switch

TO INSTALL FLYWHEEL. Remove starter plate from flywheel. Make certain keys are in position on crankshaft. Place flywheel over taper on crankshaft, at same time aligning keys and keyway in flywheel hub. Attach flywheel nut—screw down tightly, again holding flywheel with a strap wrench or hands to keep it from turning. Replace starter plate. Start and run motor ten to fifteen minutes — retighten nut as described above. Newly installed flywheel will settle slightly on taper of crankshaft after a few minutes operation and unless tightened, is apt to cause serious damage to both flywheel hub and crankshaft taper. Be sure flywheel nut is tight.

TO REMOVE ARMATURE PLATE. Loosen clamp screw *(figure 4)* located on engine side of armature plate and pull armature plate from its mounting on the bearing race. The relative position of the timing lever should be noted so that the armature plate can be placed in approximately the same position when reassembled.

TO INSTALL ARMATURE PLATE. Slide the armature plate over the bearing race until it comes to rest against the crankcase end cover. Set the timing lever in approximately the same position as before





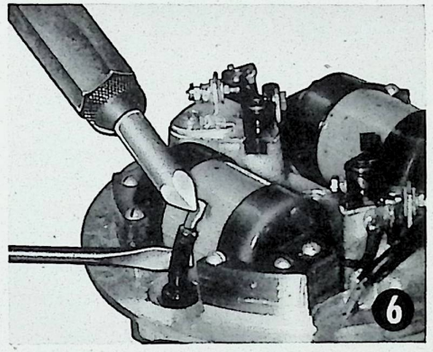
removal and tighten the clamp screw only enough to hold the armature plate in set position.

TO INSTALL NEW BREAKER POINTS. Loosen and remove nut holding breaker arm spring fast to armature plate. Remove small clip holding breaker arm on pivot post. Lift breaker arm assembly off pivot post. Remove nuts and washers holding stationery breaker point in breaker plate *(figure 5)*. Install new points, both stationery point and breaker arm assembly, in reverse order of that described above. Be sure breaker arm operates freely on pivot post and that all nuts and washers are drawn up securely. Adjust points as previously instructed. Since the breaker point cam is attached to the hub of the flywheel, the flywheel must be mounted on the crankshaft prior to attempting adjustment of the points.

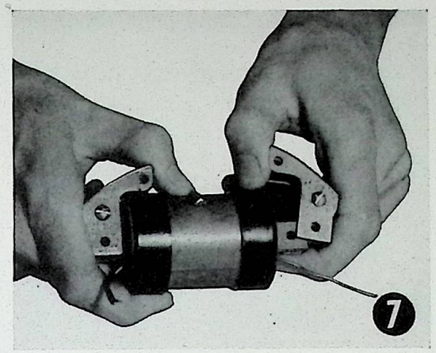
TO INSTALL NEW CONDENSER. Remove screws that fasten condenser to the engine side of armature plate. Detach condenser lead soldered to bracket on breaker plate. Lift condenser from cavity in plate. When attaching new condenser, thread small wire (condenser lead) through hole in armature plate provided for this purpose. Solder lead to bracket. Set condenser in cavity and replace screws to hold it fast.

TO INSTALL NEW IGNITION COIL. Detach primary lead (small wire) soldered to bracket on breaker plate. Detach high tension lead (spark plug wire) soldered to coil *(figure 6)*. Use small soldering iron and just enough heat to loosen soldered joint to permit pulling wire away. Remove only screws holding coil heels and coil to plate. Lift coil and heel assembly from armature plate.

The middle screw on each heel is used to hold plates of heel assembly together —do not remove this screw, merely loosen. Pry heels gently from coil. Simply pull off by hand *(figure 7)*.

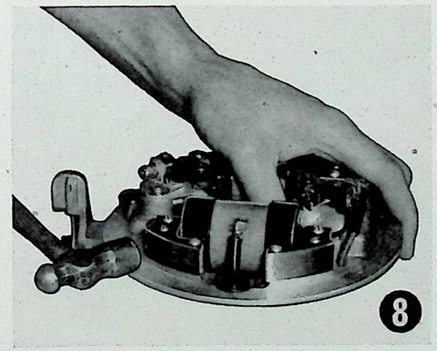


To attach coil heels to new coil, place coil and heel assembly in position on armature plate. Insert and tighten screws holding assembly to plate. Solder high tension lead (spark plug wire) to coil *(figure 6)*. Use soldering paste or rosin flux. Do not under any circumstance use acid flux—avoid detrimental effects of corrosion by NOT using acid flux. Use just enough heat, solder and flux to obtain a good substantial connection. Application of excessive heat is apt to burn off small secondary lead from coil. Over use of solder or flux will result in short circuits to render the coil inoperative.



Coil heels must be made flush with boss on armature plate to prevent striking pole shoes of magnet in the flywheel when motor is in operation *(figure 3)*. This can be accomplished in two ways—namely; by tapping heel assemblies with hammer as illustrated in *(figure 8)*; if a lathe is available, mount armature plate assembly on a mandrel between centers and turn heel surfaces down until flush with boss on armature plate. On having completed this operation, draw down further on all screws in heel assembly to make certain coil is securely mounted.

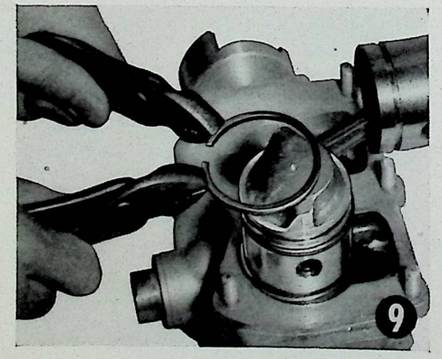
When installing a new coil, the old heels should be re-used. If it is necessary to replace with new heels, they must be turned down in a lathe after assembly on the armature plate.

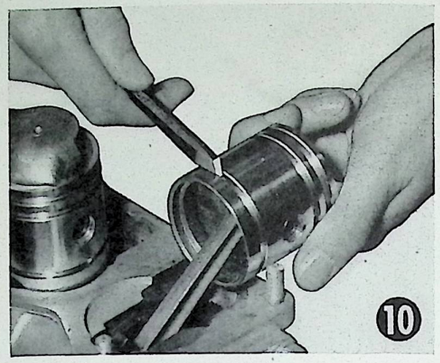


TO REMOVE PISTON RINGS FROM PISTON. To make pistons and piston rings accessible, the following disassembly is necessary.

1. Remove guard cage by removing the four screws from under side of base.
2. Remove spark plug cover.
3. Disconnect spark plug leads from spark plugs.
4. Uncouple water lines, being careful not to damage the coupling fittings.
5. Remove 2 screws holding exhaust elbow to base.
6. Unscrew 4 nuts from studs holding muffler to cylinder and remove muffler.
7. Remove cylinder side cover by removing screw located in center of starter rope holder.
8. Loosen and remove 5 nuts at base of cylinder. Care should be taken to remove these nuts evenly, lifting cylinder as nuts are removed.
9. The cylinder is removed by lifting vertically. Pistons and rings are now accessible.

Expand rings by spreading with pliers *(figure 9)*, and slide over end of piston.





There are three rings per each piston. Be careful not to spread too far, rings can be broken. Spread only far enough to permit slipping off piston.

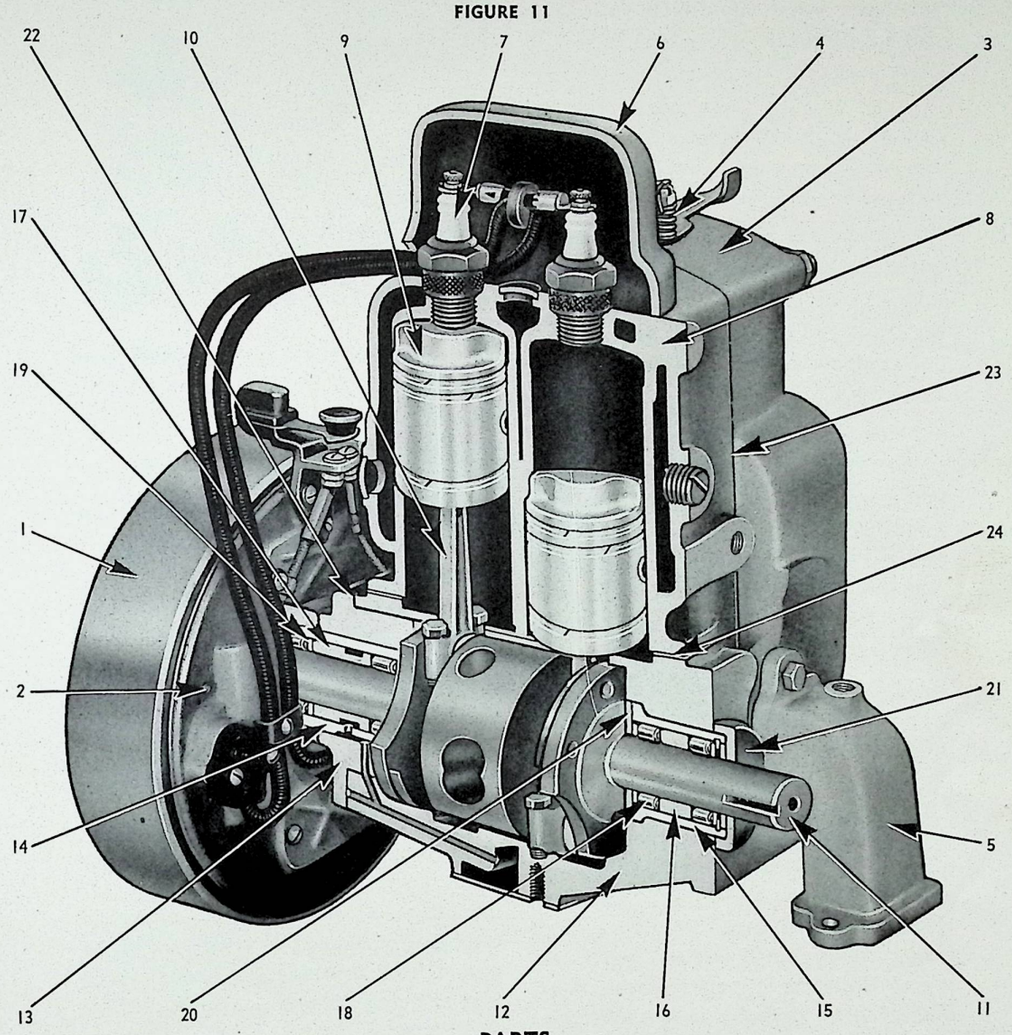
The piston ring grooves frequently become clogged with carbon after long periods of operation, which requires removal to prevent rings from sticking and becoming partially inoperative. This condition results in loss of compression and noticeable deterioration in power.

It is a simple matter to remove carbon from the ring grooves by scraping *(figure 10)*. A suitable scraper can easily be made from a discarded file or hack saw blade. It should be made slightly narrower than the ring grooves in the piston and sharp enough to scrape out accumulated carbon. Care should be taken not to scratch or damage the piston with the scraping tool. It is advisable to plug holes in crankcase with rags when scraping to keep the scrapings out.

After removing carbon from ring grooves in the piston, and prior to installing new rings, care should be exercised to make certain rings fit in piston grooves with no indication of tight spots or binding. This can be determined by rolling the rings, in their respective grooves,

ENGINE ASSEMBLY

FIGURE 11



PARTS

1. Flywheel
2. Armature Plate
3. Muffler
4. Exhaust Cut-out
5. Exhaust Manifold
6. Spark Plug Cover
7. Spark Plug
8. Cylinder
9. Piston
10. Connecting Rod
11. Crankshaft
12. Crankcase
13. Crankcase End Cover
14. Bearing Race
15. Bearing Race
16. Oil Seal
17. Spacer
18. Roller Bearing
19. Bearing Retainer
20. Thrust Washer
21. Bearing Cover
22. Gasket
23. Gasket
24. Gasket

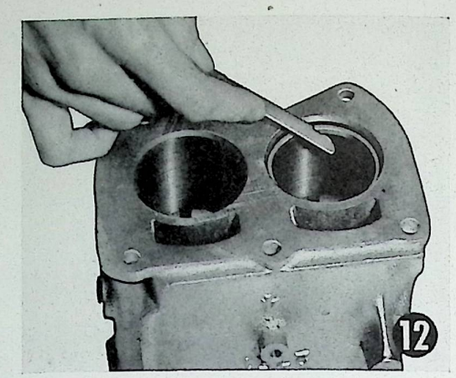
around the piston. Resistance will be encountered where tight spots exist. This may be the result of particles of carbon, burrs in piston ring grooves or high spots on edge of ring. Check grooves to see that all traces of carbon has been removed. If burrs exist, they usually can be removed with a sharp edged scraper.

High spots on edge of rings are not frequent occurrences, but if such is the case, they can be dressed down by rubbing edge (side) of ring lightly over a piece of fine sandpaper or emery cloth placed on a flat surface.

Rings must fit freely in (piston ring) grooves. Recommended clearance in piston grooves is .0015" to .0025". Piston rings and piston grooves are machined to correct size at factory and will fit properly, provided all carbon has been removed from piston grooves and no burrs are present.

Piston rings are ground to size at factory, but it is advisable to check gap clearance to make sure recommended .005" to .010" is maintained. Place each ring squarely in cylinder as illustrated in *(figure 12)*. Insert feeler gauge between ends of ring (gap). Repeat same operation for each ring in respective cylinders. If noted clearance falls below .005", file end of ring carefully until desired gap is obtained. If clearance is considerably in excess of .010", cylinder is worn oversize and should be replaced with a new cylinder. Never attempt a rebore job. Oversize pistons or rings are not manufactured for this 2 cycle engine. It is less costly to replace with a new cylinder.

TO REPLACE PISTON RINGS. Rings are replaced on pistons in reverse order of

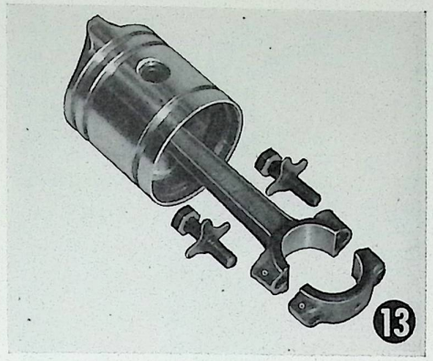


that described for their removal. Spread enough with pliers to slide over piston and into position in respective ring grooves.

If found necessary to install a new piston, the connecting rod with piston must first be removed from the crankshaft.

TO REMOVE CONNECTING ROD FROM CRANKSHAFT. For convenience of handling, it is often advisable to demount engine from the base. This is done by removing 2 bolts from the vertical mount located under the coupling and 3 screws from underside of base. Put engine, resting on its natural base, in a vise.

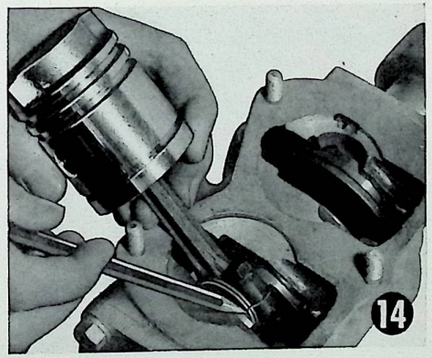
To remove connecting rod from crankshaft, bend ears of connecting rod screw locks down by using a punch and hammer. Remove connecting rod screws. As connecting rod and piston assembly is removed from crankshaft the needle bearings and connecting rod cap will fall into the crankcase. These can be retrieved by turning the crankcase upside down and shaking. There are 29 needle bearings in each connecting rod assembly, 58 needle bearings in all. Be sure and account for all 58 bearings at this time as a lost bearing left loose in the engine will cause extensive damage.



TO REPLACE CONNECTING RODS. Apply a small amount of medium weight grease to hold needle bearings in place. 29 needle bearings per each connecting rod. These are easily placed in position with fingers and pliers.

Connecting rods and connecting rod caps must not be interchanged, but must be replaced in their original matched position. Both cap and rod have been marked with a punch and should be assembled so they are properly matched, that is, one hole directly above the other *(figure 13)*.

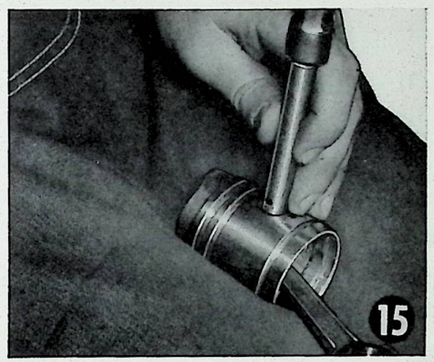
Place bearing cap in bolting position and hold with a finger. Then place the connecting rod in alignment and screw together with screw locks in place. It must be noted that the sloping side of the



piston top faces the carburetor side of the engine. Draw the connecting rod screws up snugly; do not tighten them with force at this time.

Line the machined surfaces of the cap by tapping on one side or the other until they are perfectly lined. This can best be determined by drawing a pencil over the point of the two halves *(figure 14)*. After the cap and rod are in perfect alignment, tighten the connecting rod screws as tightly as possible.

Bend the locks up into place, being careful to bend them up far enough to



clear the crankshaft. It is advisable to install new locks as used ones may break, causing serious damage to the engine.

TO REMOVE PISTON FROM CONNECTING ROD. Pistons can be removed from connecting rod only after the connecting rod has been removed from the crankshaft.

Remove both lock rings at either end of wrist pin by pinching with pliers and lifting out. To facilitate the easy removal of the wrist pin, hold the piston in hot water to cause expansion. The wrist pin is then driven out. This is best done by holding the assembly between the knees while in a seated position to prevent springing piston when driving force is applied *(figure 15)*. Note: The wrist pin

is not tight in both sides of the piston. The loose side of the piston is marked with a drill spot on the wrist pin boss inside the piston. When removing the wrist pin drive from the tight side to the loose side of the piston.

Handle piston carefully. Burrs are the result of rough handling or dropping.

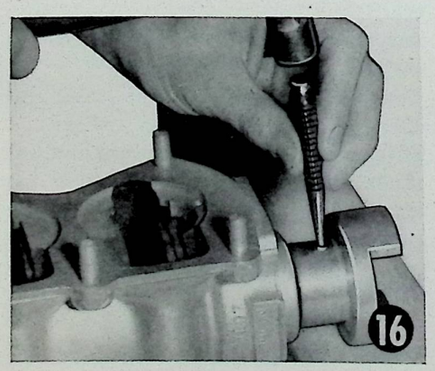
If a worn wrist pin bushing in the connecting rod is to be replaced, the old one can be pressed out and a new bushing pressed in with the use of an arbor press.

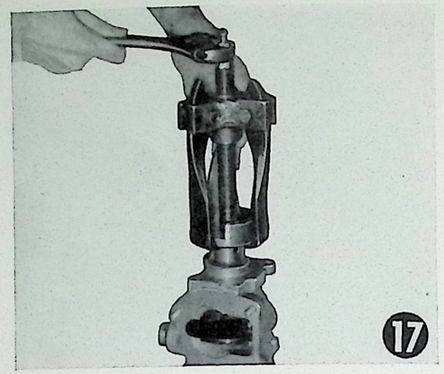
If the bearing surface in the larger end of the connecting rod indicates wear, the entire connecting rod should be replaced.

TO INSTALL PISTON. Heat piston by submerging in hot water. This will cause expansion and allow the wrist pin to be easily driven into place. Insert wrist pin into loose side of piston and drive into the tight side. Lock wrist pin in position with snap rings in grooves in piston at both ends of wrist pin.

TO REMOVE CRANKSHAFT FROM CRANKCASE. After connecting rods, with pistons, have been disassembled from crankshaft, the cylinder base gasket is removable. If this gasket is damaged, it is necessary to replace it with a new one.

Remove taper pin from coupling by





means of a punch and hammer. Place a block under coupling so as not to risk bending the crankshaft *(figure 16)*. Hammer on small end of taper pin. After pin has been punched out, coupling can be removed by a 3-jaw gear puller *(figure 17)*, or an arbor press. Remove 2 Woodruff Keyes from tapered end of crankshaft by driving downward on end of key which will rotate key out of keyway. Care should be taken not to nick or gouge the crankshaft taper. If accidentally nicked, simply dress down with a file.

After removing 4 nuts, crankcase head and crankshaft can be removed from crankcase. Care should be taken to not lose any of the many small parts.

Upon removing head from crankshaft, one row of bearings and their bearing retainers will fall out. The remaining bearings, bearing retainers, spacer and leather oil seal are removed by pressing them all out at once with an arbor press. After crankshaft has been removed, bearings and retainer can be shaken from the coupling end of crankcase. Thrust washers and shims, which are used to adjust end play in crankshaft, are easily removed. The remaining bearings can be

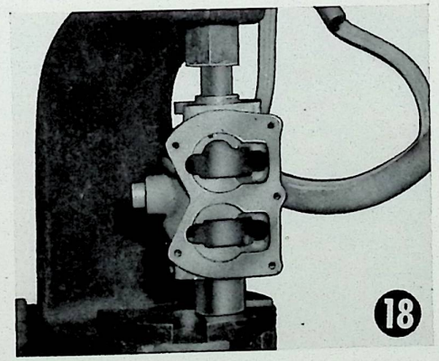
removed only from the coupling end of the crankcase. This can be done by removing the dust cover with a chisel and hammer. Then remove lock ring by using pliers.

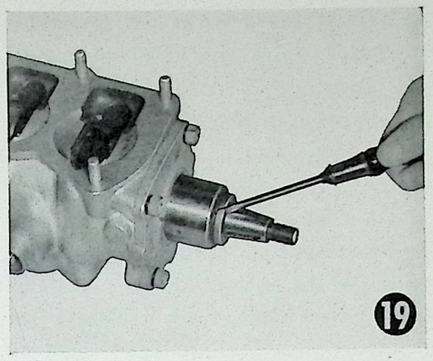
If the oil seal or bearing race in crankcase is worn, it must be replaced. This is done by placing crankcase in a vertical position over a piece of pipe, and with the use of an arbor press, pressing seal or race down inside pipe *(figure 18)*. An arbor press is also necessary to install seal or race.

If the rotary valve bushing becomes damaged, the entire crankcase must be replaced as the bushing in an integral part of the crankcase.

If the bearing race in the crankcase head is worn, the entire head assembly must be replaced as the bearing race for the crankcase head is not furnished separately by the manufacturer.

Older style pumpers have a different type of crankcase head assembly. The oil seal is of the same type as in the coupling

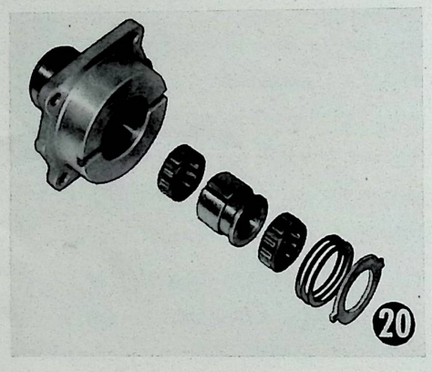




end of the crankcase, that is, pressed into the bearing race between the rows of roller bearings. A slinger, in the form of a split washer, is located in the same position as the newer type oil seal. For removal of crankcase head, this slinger must first be taken off. This is done by driving a small tapered tool in slot of slinger to expand it *(figure 19)*. It will then slide off shaft.

TO REASSEMBLE CRANKSHAFT IN CRANKCASE. Assemble 12 bearings in a single or one piece bearing retainer and insert the assembly in the coupling end of crankcase from the outside. Next, snap the lock ring into place. Assemble 12 more bearings in the other one piece bearing retainer and insert this assembly into position in the crankcase from the inside. Slip thrust washer over coupling end of crankshaft with the cupped side of washer against crankshaft (thrust washer on this end of crankshaft is without ears). Insert crankshaft into place in crankcase.

Assemble crankcase head *(figure 20)* in the following manner. First press spacer into position by use of an arbor press. The heavy end, which has 4 slots, is towards the leather oil seal end of the bearing race. Next assemble a set of 12 rollers in a 2-piece bearing retainer and place this assembly in position against the spacer in the leather oil seal end of the bearing race. Next press the oil seal into its proper position. The last set of rollers in their 2-piece retainer should now be inserted into the bearing race against the spacer. Place shims and thrust washer in position with the thrust washer on top.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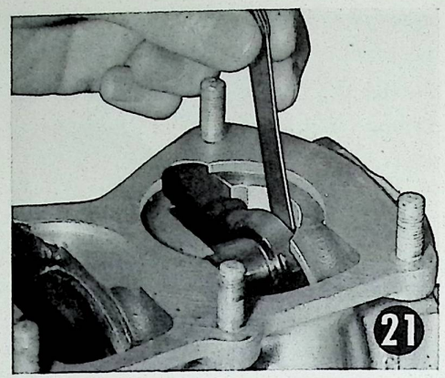
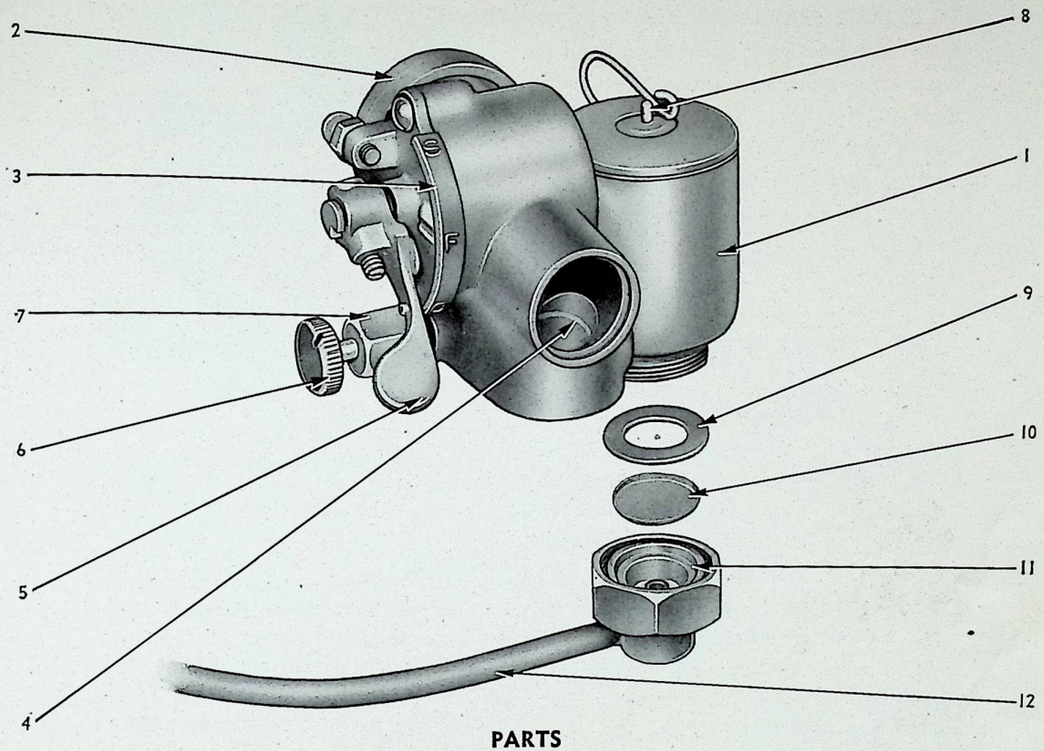

21

(Ears of thrust washer fit into slots.) Place head gasket over the head studs. Next slide crankcase head into bolting position. Cinch up evenly on all 4 nuts. Check the crankshaft for end play which should be .004" to .005" *(figure 21)*. If the end play is not correct, the crankcase head will have to be removed and the shims removed or additional shims installed under the thrust washer, as the case may be. Shims are supplied by the manufacturer in .003" and .010" sizes.

When replacing the crankcase head, cylinder or muffler, be sure to tighten all nuts slowly and evenly.

CARBURETOR ASSEMBLY

FIGURE 22



PARTS

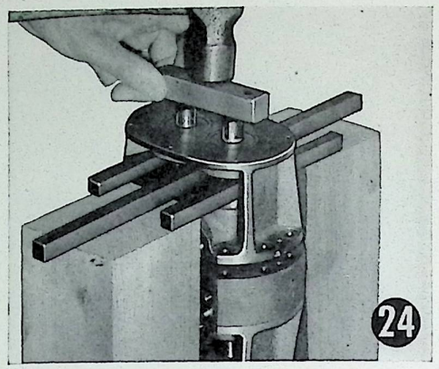
1. Carburetor body
2. Clamp ring
3. Valve cover and quadrant
4. Air intake
5. Throttle lever
6. Needle valve
7. Packing nut
8. Float pin
9. Gasket
10. Screen
11. Setting basin
12. Gas line from tank

TO DISASSEMBLE CARBURETOR. The carburetor is easily removed by disconnecting the gas line at the gas tank, loosening clamp screw and pulling carburetor from its engine mount. Disconnect other end of gas line from base of carburetor. This exposes gas line screen and gasket for inspection and cleaning. This screen and gasket should be kept in good condition and occasionally should be replaced. Place throttle lever in "fast" position and remove 2 screws holding valve cover. Now valve and cover can be removed, exposing small hole in nozzle. Unscrew needle valve to remove. Fuel lines occasionally become clogged and require cleaning. This is done by inserting a small wire through the open needle valve hole and also through the hole in the nozzle, forcing out particles of foreign matter that may have lodged there. Float valve can be removed for inspection by taking off float cover, spreading pin and pushing float valve pin down through cork.

The purpose of the screens in the gas tank and at the base of the carburetor is to keep foreign matter from entering and plugging the small holes in the carburetor. Keep these screens in good condition.

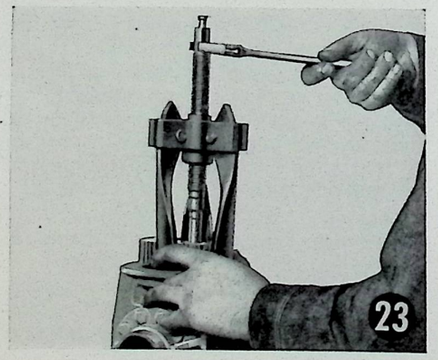
PUMP

TO DISASSEMBLE PUMP. Remove pump from base as follows; Disconnect cooling water tubes from discharge side of pump. Shut off fuel valve and disconnect fuel line at tank. Remove tank filling cap including screen. Unscrew the four cap screws holding pump to base and slide pump off under the hand rail. Newer pumpers have gas tank suspended from hand rail and it does not need to be removed when demounting pump from base.



Tank comes off with the removal of the four holding machine screws. Next, the pump half of the aluminum jaw coupling must be removed as follows; Support the coupling on a block of wood to prevent bending the shaft and drive out taper pin with punch and hammer. Hammer on small end of the taper pin. After pin has been punched out, coupling can be removed by the use of a 3-jaw gear puller or an arbor press. For ease of handling, remove all grease cups. Remove remaining 4 screws from bearing cover and take cover off.

Drain oil from gear case, remove remaining 4 screws, and take case off. The pump legs should next be removed. This is done by unscrewing the 20 screws from the circular flanges.

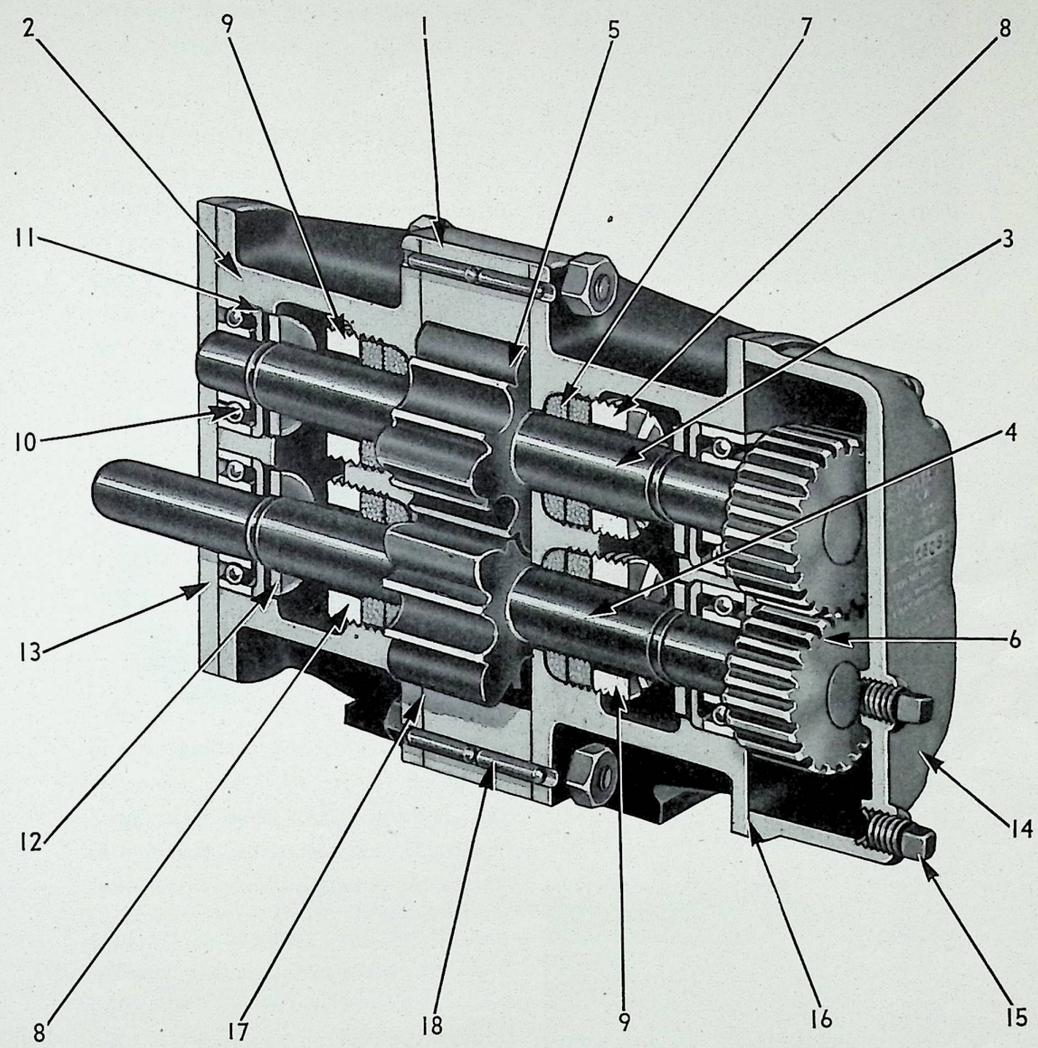


The 2 gears can be taken off, one at a time, by means of a 3-jaw gear puller *(figure 23)*. The jaws on the puller must be thin enough to fit behind the gears. These gears are mounted on the shafts with a force-fit and will require considerable effort with a good gear puller for their removal. If gears and shafts are to be reassembled in the pump, their relative position in assembly must be noted. It is suggested that the gears be marked with a punch mark, which, when reassembled, will assure the correct position of the gears. Next, remove the 2 spacers from the shafts. These should be easily removed with the fingers.

Remove the 16 nuts from the studs holding the end bodies and cylinder together. The ball bearing assemblies are pressed on the shafts and also into the end bodies. Therefore, it requires force to remove the bearings and the end bodies from the pump. An accepted method for doing this is to use 2 blocks and 3 pieces of key stock *(figure 24)*. The blocks being

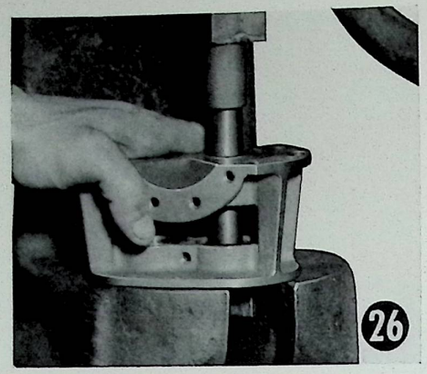
PUMP ASSEMBLY

FIGURE 25

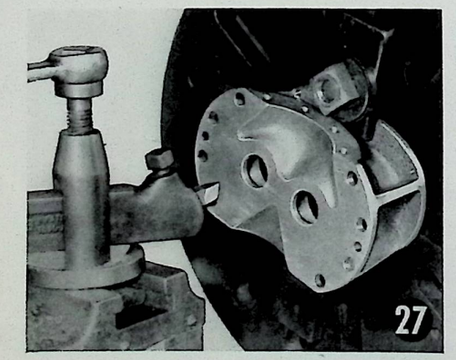


PARTS

1. Cylinder
2. End Body
3. Shaft, short
4. Shaft, long
5. Impeller
6. Pilot Gear
7. Packing
8. Packing Nut, right
9. Packing Nut, left
10. Ball Bearing
11. Bearing Retainer
12. Flinger
13. End Cover
14. Gear Case
15. Inspection Plug
16. Gasket
17. Gasket
18. Dowel Pin



high enough so that the pump can be suspended between them on the key stock which has been slipped through the end body. The pump is now in a vertical position, gear end of shafts up. Key stock should be up against the shafts with the pump resting on the flingers. Place a piece of soft bronze squarely on the ends of the shafts and by hammering on the bronze, drive the shafts down simultaneously. The end body and cylinder are now removed. To remove the shafts from the other end body, place the end body as before on the key stock and blocks. Shafts can be driven out separately.



Ball bearing assemblies can be removed from end bodies by use of an arbor press *(figure 26)*. Packing can be removed from end bodies by first removing packing nuts.

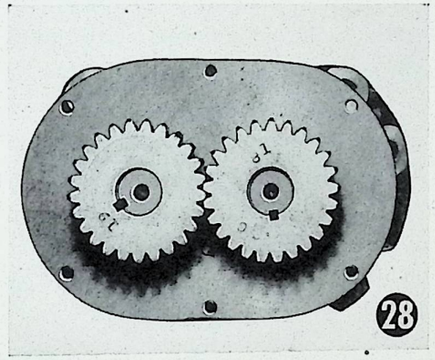
TO REASSEMBLE PUMP. Before reassembly, be sure that all parts are in good condition. If end bodies, impellers and cylinder show excessive wear, replacement of the cylinder and impellers and the refacing of the end bodies in a lathe *(figure 27)* is advisable. If the sides only of the impellers show wear, they can be refaced on the sides but it is also necessary to reface the cylinder to keep the width of the impellers and the cylinder the same. If impellers need replacement, it is necessary to install both new shafts and impellers, as they are furnished only in assembly. If impellers or cylinder is pitted, it is possible to fill these holes with solder and dress down with a file.

Replace packing and packing nuts in end bodies. Note that 2 nuts have left hand threads and 2 have right hand threads. Do not install ball bearings in the end bodies at this time.

Insert the pilot gear end of the long shaft, which has a straight key way for square key, into one of the end bodies through the packing having a left hand threaded packing nut. Insert the short shaft, gear end first, matching up punch marks on impeller lobes. Try gears on ends of shafts loosely in different meshing positions until key ways of gears and

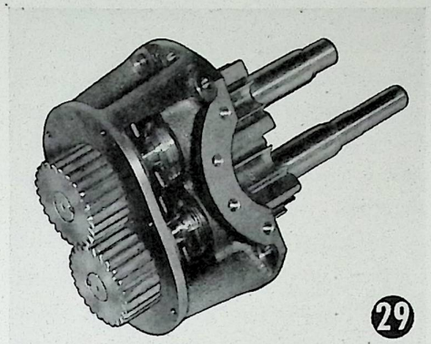
shafts line up *(figure 28)*. NOTE: (Impellers have 4 lobes and gears have 25 teeth.) It is necessary to have the proper meshing of the impellers correspond with the proper meshing of the gears, in order to bring the key way of the gear and the key seat of the shaft in line. When proper position has been found, mark the gears and remove them from the ends of the shafts.

Now, remove the short shaft from the end body. With the long shaft remaining in the end body, drive flinger into place with a hammer and a suitable sleeve type



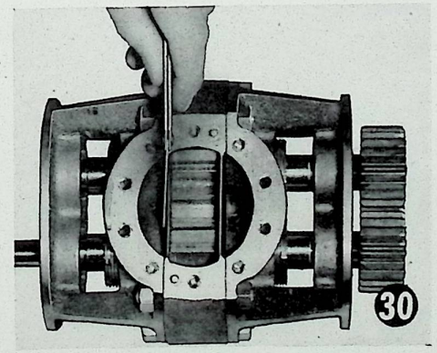
tool. Drive bearing retainer into place. Next, with the use of a sleeve type tool that contacts both inner and outer bearing race, drive ball bearings gently into place. Bearings are in proper position when impeller has a light friction contact with the end body and the shafts turn easily with the fingers. Next put washer type spacer into place and drive on pilot gear. When driving parts into place, rest shaft on medium soft piece of metal. Follow the same procedure in the installation of the shorter shaft. The assembly at this point is shown in *(figure 29)*.

Place gasket of approximately .0015" thickness in position on end body and put cylinder in place, aligning up by means of the dowel pins. Place another gasket of approximately .0015" thickness in position on top of cylinder and place other end body in place.



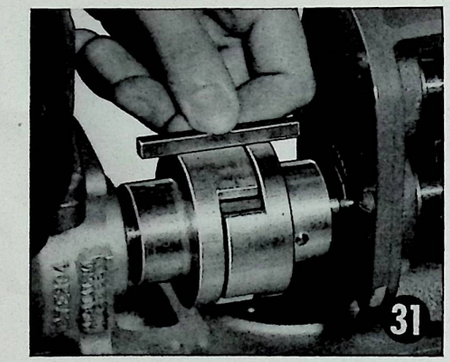
Insert studs and bolt end bodies and cylinder together. At this point check clearance between impellers and end body last installed, with feeler gauge *(figure 30)*. This clearance should be .003" between the impellers and this end body. If proper clearance is not obtained, adjustment is made by increasing or decreasing the thickness of the cylinder gaskets.

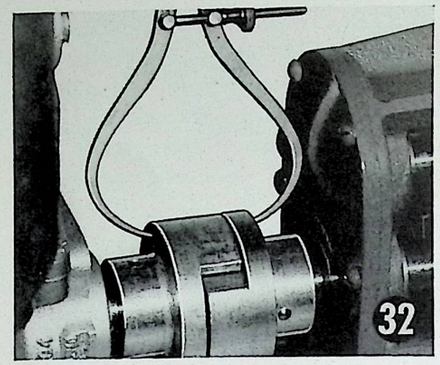
Install remaining flingers, bearing re-



tainer and bearings in end body. Particular care must be taken when driving these bearings into place. It is by driving on these bearings that the impellers are drawn over and centered between the end bodies. Be very careful not to draw the impellers past center position. Replace pump legs with flange gaskets in place.

Place gasket on coupling end of pump and screw on pump end cover. Then, with the use of an arbor press, key on coupling. End of shaft should be recessed approximately $\frac{1}{16}$" below face of coupling. Install taper pin. Replace gasket and gear case and also grease cups. If gas tank mounts on pump it is next fastened into place.





Remount pump on pumper base. Proper and accurate alignment of pump shaft with engine crankshaft is absolutely necessary. To check alignment, use a straight edge across the top and sides of coupling *(figure 31)*. Any compensation necessary is made by adding or removing shims from under feet of pump. Side alignment can be checked with outside calipers by measuring from the back of the flange on one coupling to the back of the flange on the other coupling *(figure 32)*.

Couple water lines to pump and gas line to gas tank. Refill gear case and grease cups with oil and grease.

Section 3

REPAIR PARTS CATALOG

When ordering parts from this catalog, it is important that factory part name and number be correctly given. It is also important that the pumper serial number be given when possible.

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Armature Plate Parts 52-55

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Flywheel Assembly Parts 56-57

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Foam Equipment Parts 64-67

Miscellaneous Parts 66-67

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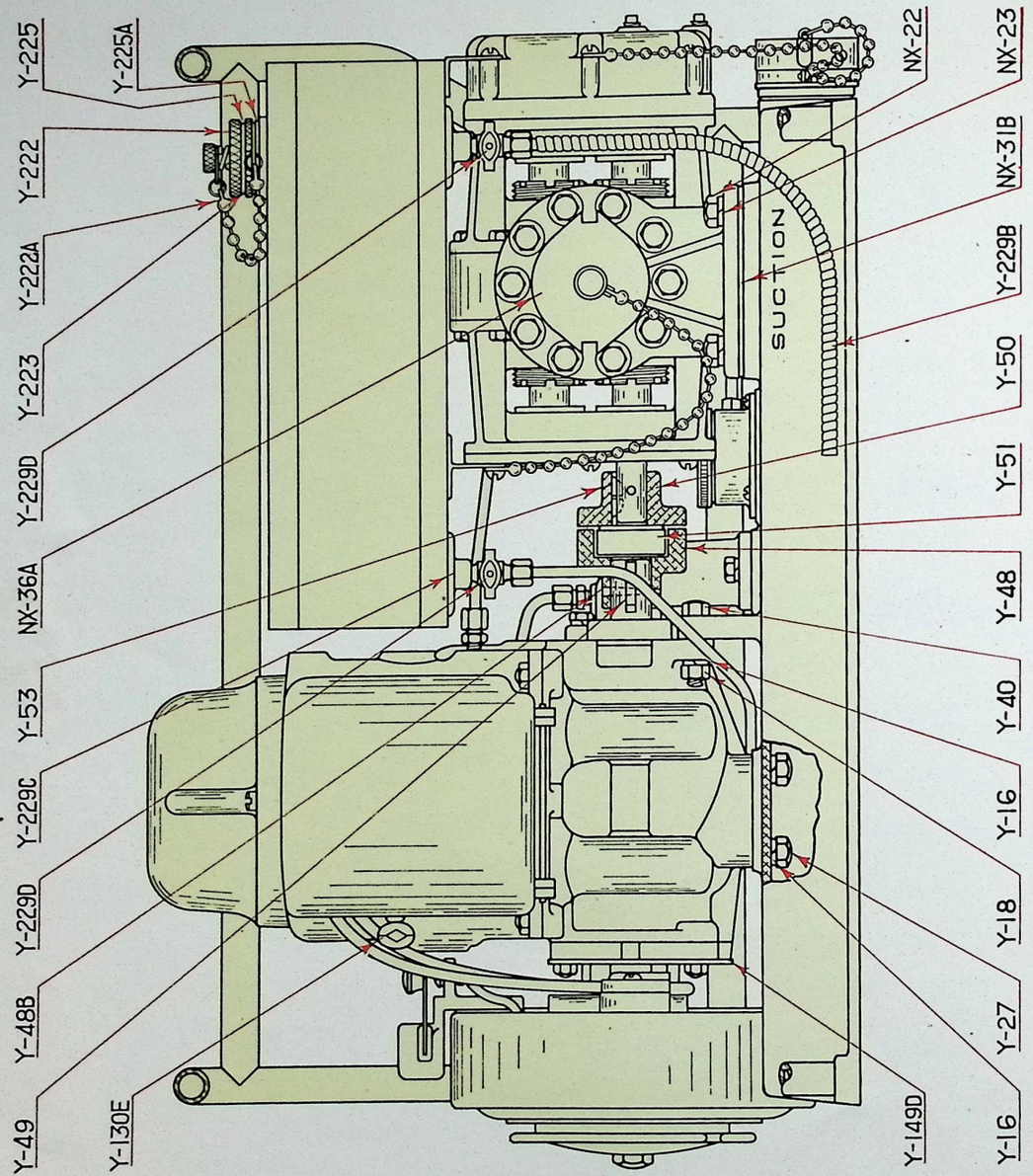
PUMPER UNIT—SUCTION SIDE

DRAWING NO. 1



PUMPER UNIT PARTS

DRAWING NO. 1

*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-27	Screw—engine to base	Steel	3	
Y-28	Lockwasher for Y-27	Steel	3	
Y-40	Screw—engine to vertical mount	Steel	1	
Y-40A	Nut for Y-40	Steel	1	
Y-40B	Lockwasher for Y-40	Steel	1	
Y-47	Coupling—pump to engine		1	Includes: 1 Y-48 Engine half coupling 2 Y-48B Taper Pin 1 Y-49 Key for Y-48 1 Y-50 Pump half coupling 1 Y-51 Center coupling block 2 Y-53 Key for Y-50
Y-48	Engine half coupling	Aluminum	1	
Y-48B	Taper pin	Steel	2	
Y-49	Key for Y-48	Steel	1	
Y-50	Pump half coupling	Aluminum	1	
Y-51	Center Coupling block	Fibre	1	
Y-53	Key for Y-50	Steel	2	
Y-130E	Wing screw	Steel	1	
Y-149D	Stop for armature plate	Steel	1	
Y-222	Cap for tank	Bronze	1	
Y-222A	Chain and rings for Y-222	Brass	1	
Y-223	Strainer for tank	Brass	1	
Y-223A	Tank cap and screen assembly		1	Includes: 1 Y-222 Cap for tank 1 Y-222A Chain & rings for Y-222 1 Y-223 Strainer for tank 1 Y-225 Gasket for cap 1 Y-225A Gasket for strainer
Y-225	Gasket for cap		1	
Y-225A	Gasket for strainer		1	
Y-229B	Drain tube	Copper	1	Omitted from late model pumpers
Y-229C	Flange for cocks	Brass	2	
Y-229D	Cock	Brass	2	
NX-22	Screw—pump to base	Steel	4	
NX-23	Lockwasher for NX-22	Steel	4	
NX-31B	Shims—pump to base	Brass		Sold in complete sets of assorted thicknesses only.
NX-36A	2" Thread protection cap with chain	Zamac & Brass	1	

Y-200
Y-18
Y-16
Y-39
Y-23
Y-24
Y-202
Y-206
Y-169
Y-168
Y-207

PUMPER UNIT PARTS

DRAWING NO. 2

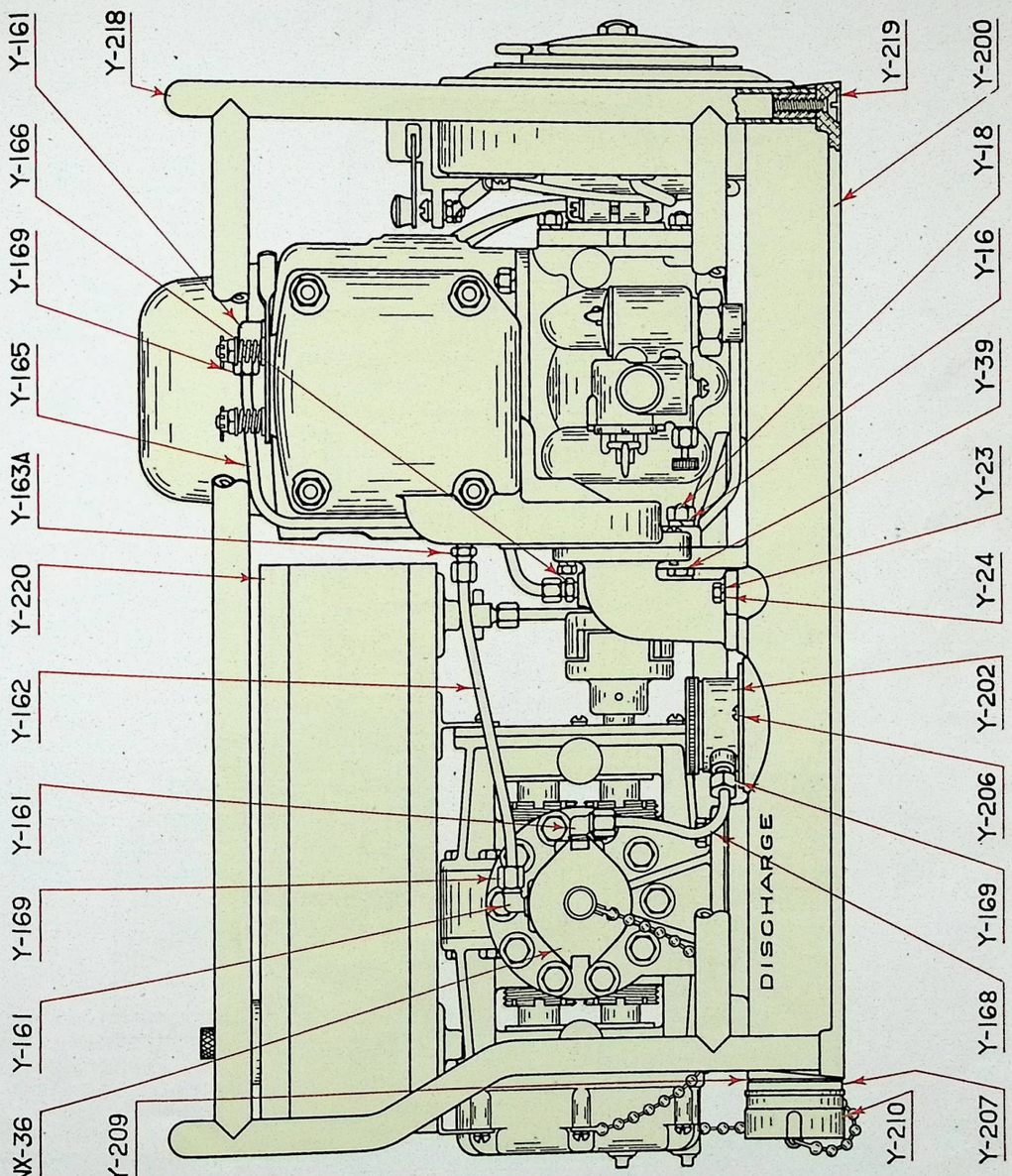
*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-23	Screw—manifold to base	Steel	3	
Y-24	Lockwasher for Y-23, Y-23A	Steel	4	
Y-39	Screw—engine to vertical mount	Steel	1	
Y-39A	Nut for Y-39	Steel	1	
Y-39B	Lockwasher for Y-39	Steel	1	
Y-161	Elbow for water line	Brass	3	
Y-162	Tube—pump to engine	Copper	1	
Y-163A	Restricted flow connector	Brass & Copper	1	
Y-165	Tube—engine to manifold	Copper	1	
Y-166	Straight connector	Brass	1	
Y-168	Tube—pump to gauge	Copper	1	For gauge mounted on base
Y-168A	Tube—pump to gauge	Copper	1	For gauge mounted on bracket
Y-169	Nut for tubing	Brass	8	
Y-170	Sleeve for Y-169	Brass	8	Not shown on drawing
Y-200	Base	Aluminum	1	
Y-201	Expansion plugs for base	Brass	4	Not shown on drawing
Y-202	Gauge		1	
Y-203	Gauge bracket	Iron	1	Not shown on drawing
Y-205	Gauge glass	Glass	1	Not shown on drawing
Y-206	Screws for gauge	Brass	3	
Y-207	Nipple for exhaust hose	Aluminum	1	
Y-208	Screws for exhaust nipple	Brass	4	Not shown on drawing
Y-209	Gasket for exhaust nipple		1	
Y-210	Blowoff cap assembly	Zamac & Brass	1	
Y-211	Exhaust hose instruction Decal.		1	Not shown on drawing
Y-218	Guard cage	Steel	1	
Y-219	Screws for guard cage	Steel	4	
Y-220	Gas tank with fittings	Copper	1	Redesigned tank is strap suspended from guard cage
Y-226	Starting instructions Decal.		1	Not shown on drawing
NX-24	Screw for tank straps	Brass	3	For redesigned tanks
NX-24B	Nut for NX-24	Brass	3	For redesigned tanks
NX-36	1½" Thread protection cap with chain	Zamac & Brass	1	

Y-225 Y-222 Y-222A Y-223 Y-229D NX-36A Y-53 Y-229C Y-229D Y-48B Y-49

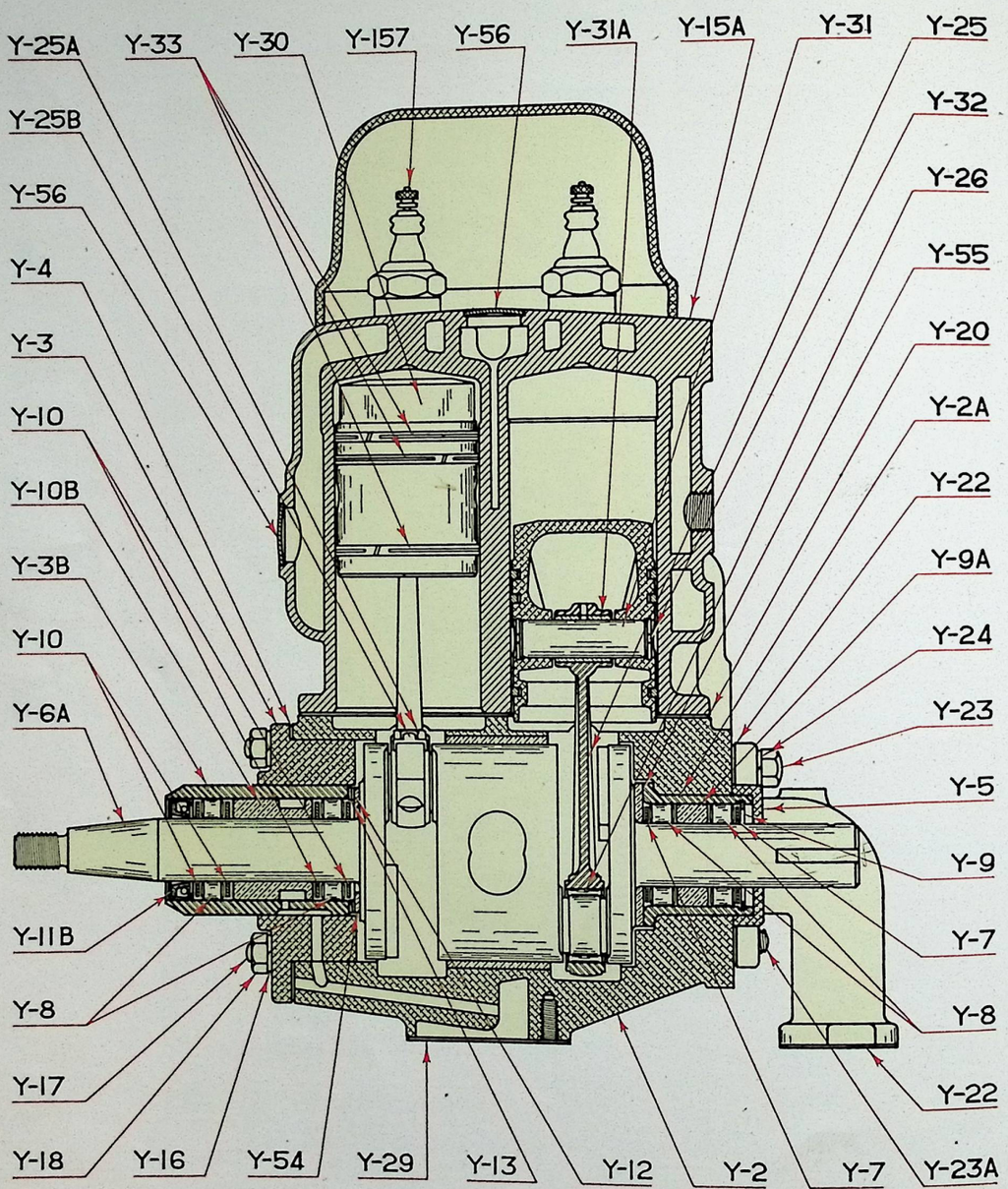
PUMPER UNIT—DISCHARGE SIDE

DRAWING NO. 2



ENGINE—SECTIONAL ASSEMBLY

DRAWING NO. 3



ENGINE PARTS

DRAWING NO. 3

*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-1	ENGINE COMPLETE		1	
Y-2	Crankcase	Alum. Steel & Bronze	1	Includes: 1 Y-2A Bearing race 1 Y-9A Oil seal
Y-2A	Bearing race, coupling end	Steel	1	
Y-3	Crankcase end cover assembly	Alum. Steel & Bronze	1	Includes: 1 Y-3B Bearing race 1 Y-11B Oil seal 1 Y-10B Spacer 2 Y-10 Retainers
Y-3B	Bearing race, magneto end	Steel	1	*Part of Y-3
Y-4	Gasket—crankcase end cover		1	
Y-5	Bearing cover	Zamac	1	
Y-6A	Crankshaft	Steel	1	
Y-7	Retainer—roller bearing, coupling end	Steel	2	
Y-8	Roller bearings	Steel	48	Sold in sets of 48 only
Y-9	Snap ring for Y-2A	Steel	1	
Y-9A	Oil seal, coupling end	Bronze	1	
Y-10	Retainer—roller bearing, Magneto end	Steel	4	
Y-10B	Spacer	Bronze	1	
Y-11B	Oil seal—magneto end	Steel	1	
Y-12	Shim—.003	Steel	2	
Y-13	Shim—.010	Steel	2	
Y-15A	Cylinder	Cast Iron	1	
Y-16	Lockwasher for Y-18	Steel	9	
Y-17	Stud—crankcase to end cover	Steel	4	
Y-18	Nut for Y-17, and Y-19	Steel	9	
Y-20	Gasket—cylinder to crankcase		1	
Y-22	Gasket—exhaust manifold	Asbestos	2	
Y-23	Cap screw—manifold to muffler and base	Steel	3	
Y-23A	Screw—fillister head, manifold to muffler	Steel	1	
Y-24	Lockwasher for Y-23 and Y-23A	Steel	4	
Y-25	Connecting rod assembly	Steel & Bronze	2	Includes: Con. rod and cap with 1 Y-31A Bushing 2 Y-25A Screws 2 Y-25B Locks
Y-25A	Screw for connecting rod	Steel	4	
Y-25B	Lock for connecting rod screw	Steel	4	
Y-26	Needle bearings	Steel	58	Sold in sets of 58 only
Y-29	Gasket—base to crankcase		1	
Y-30	Piston	Aluminum	2	
Y-31	Wrist pin	Steel	2	
Y-31A	Wrist pin bushing	Bronze	2	
Y-32	Lock ring for wrist pin	Steel	4	
Y-33	Piston ring	Cast Iron	6	Sold in sets of 6 only
Y-54	Thrust washer—magneto end	Bronze	1	
Y-55	Thrust washer—coupling end	Bronze	1	
Y-56	Expansion plug for cylinder	Steel	2	
Y-157	Spark plug with gasket		2	

Y-35

Y-37B

Y-37C

Y-37A

Y-34

Y-36

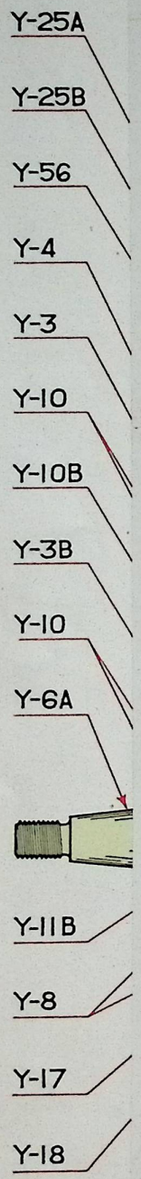
Y-21

ENGINE PARTS

DRAWING NO. 4

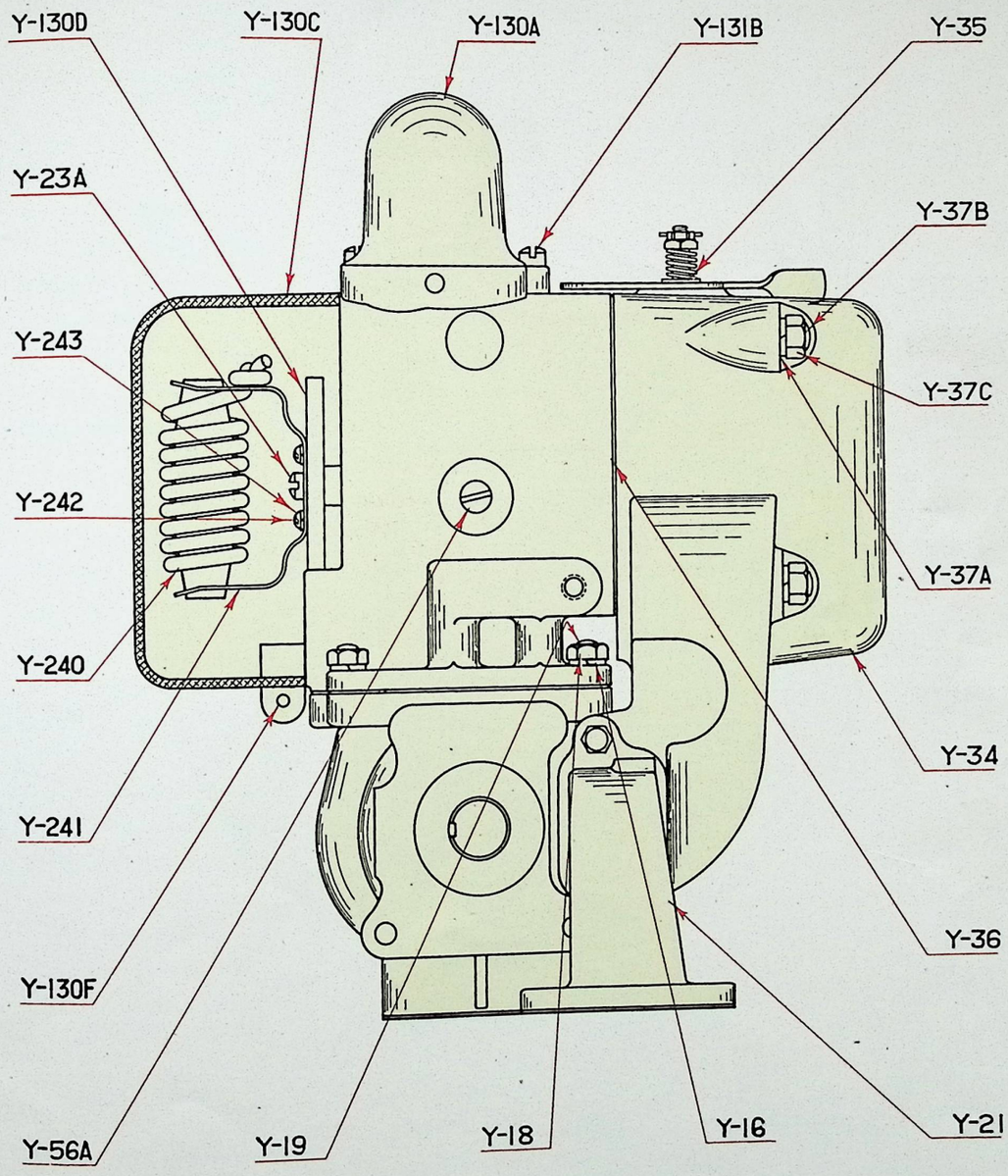
*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-18	Nut for Y-17 and Y-19	Steel	9	
Y-18A	Lockwasher for Y-19	Steel	9	
Y-19	Stud—cylinder to crankcase	Steel	5	
Y-21	Exhaust manifold	Aluminum	1	
Y-34	Muffler	Aluminum	1	
Y-35	Exhaust cutout assembly	Alum. Steel & Bronze	1	
Y-36	Gasket—cylinder to muffler	Asbestos	1	
Y-37A	Washer for Y-37C	Steel	4	
Y-37B	Stud—cylinder to muffler	Steel	4	
Y-37C	Nut for Y-37B	Steel	4	
Y-56A	Pipe plug	Bronze	1	
Y-130A	Spark plug cover	Aluminum	1	Includes 2 Y-131B screws
Y-130C	Cylinder side cover	Aluminum	1	
Y-130D	Side cover bracket	Aluminum	1	
Y-130F	Side cover pin	Brass	1	
Y-130G	Screw for bracket	Steel	1	
Y-131B	Screw for spark plug cover	Steel	2	
Y-240	Starter rope with handle	Cotton & Wood	1	
Y-241	Holder for starter rope	Brass	1	
Y-242	Screw for holder	Brass	2	
Y-243	Lockwasher for Y-242	Steel	2	
Y-250	GASKETS—complete set for engine including:			
	1 Y-4 crankcase end cover			
	1 Y-20 cylinder to crankcase			
	2 Y-22 exhaust manifold			
	1 Y-29 base to crankcase			
	1 Y-36 cylinder to muffler			
	1 B-84 screen for strainer (carburetor)			
	1 B-85 gasket for strainer (carburetor)			



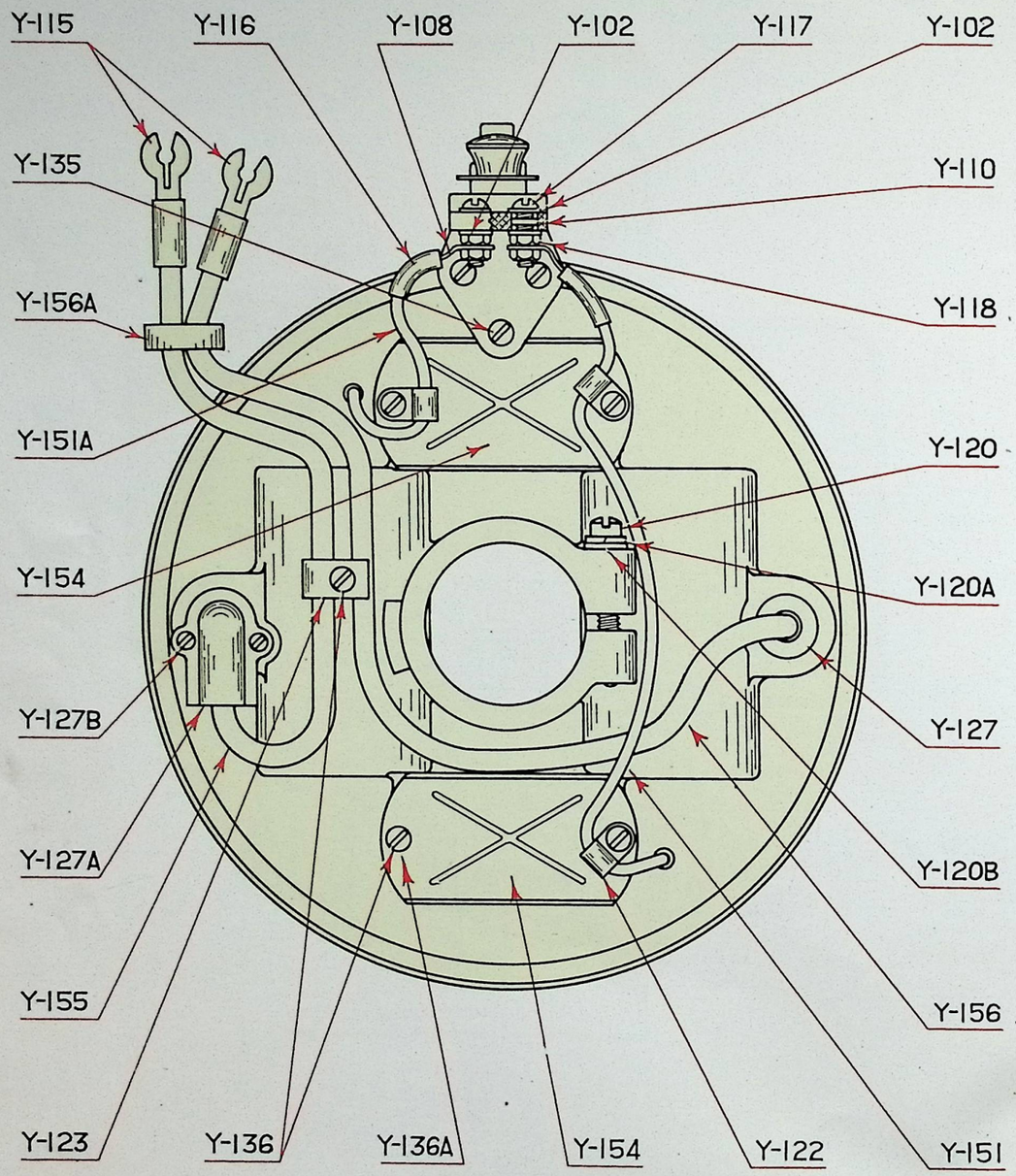
ENGINE—COUPLING END

DRAWING NO. 4



ARMATURE PLATE—ENGINE SIDE

DRAWING NO. 5



ARMATURE PLATE PARTS

DRAWING NO. 5

*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-149	MAGNETO COMPLETE		1	
Y-150	ARMATURE PLATE ASSEMBLY COMPLETE		1	
Y-102	Insulation washer	Fibre	8	
Y-108	Terminal for cutout lead	Copper	2	*Part of Y-151 and Y-151A
Y-110	Insulation bushing	Fibre	4	
Y-115	Terminal for H. T. lead	Brass	2	*Part of Y-155 and Y-156
Y-116	Tubing for cutout leads	Cotton	4	
Y-117	Screw—for stop switch	Brass	2	
Y-118	Nut for Y-100, Y-117 and Y-138	Brass	8	
Y-120	Screw for armature plate clamp	Steel	1	
Y-120A	Lockwasher for Y-120	Steel	1	
Y-120B	Cutwasher for Y-120	Steel	1	
Y-122	Clamp for cutout lead	Brass	3	
Y-123	Clamp for H. T. lead	Brass	1	
Y-126	Felt pad for condenser pocket	Felt	2	Not shown on drawing
Y-127	Grommet, rubber—for H. T. lead	Rubber	1	
Y-127A	Grommet, bakelite—for H. T. lead	Bakelite	1	
Y-127B	Screw for Y-127A	Steel	2	
Y-135	Screw for timing lever	Steel	3	
Y-136	Screw for condenser and ground	Brass	7	
Y-136A	Lockwasher for Y-135 and Y-136	Steel	9	
Y-151	Cutout lead assembly—long	Copper	1	
Y-151A	Cutout lead assembly—short	Copper	1	
Y-154	Condenser		2	
Y-155	High tension lead—short	Copper	1	
Y-156	High tension lead—long	Copper	1	
Y-156A	Grommet for H. T. lead (spark plug ends)	Rubber	1	

Y-125
Y-147
Y-146
Y-112

ARMATURE PLATE PARTS

DRAWING NO. 6

*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-112	Screw for mounting coil	Steel	8	
Y-125	Armature plate casting only	Aluminum	1	
Y-129	Screw for heels	Steel	4	
Y-136	Screw for ground and condenser	Brass	7	
Y-140	Timing lever assembly	Alum. & Brass	1	
Y-146	Heel assembly—right	Steel	2	
Y-147	Heel assembly—left	Steel	2	
Y-148	Coil—ignition		2	

Y-115

Y-135

Y-156A

Y-151A

Y-154

Y-127B

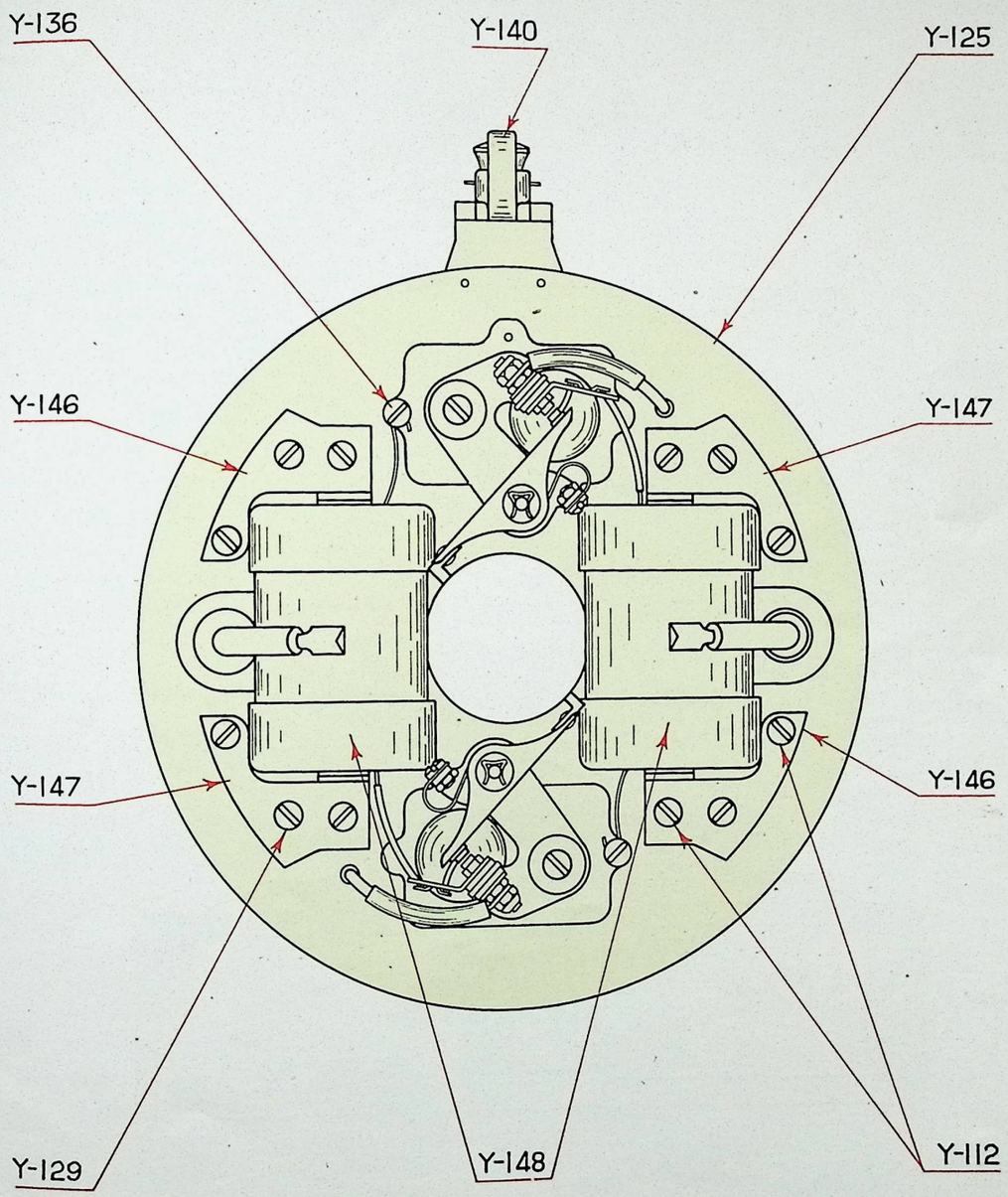
Y-127A

Y-155

Y-123

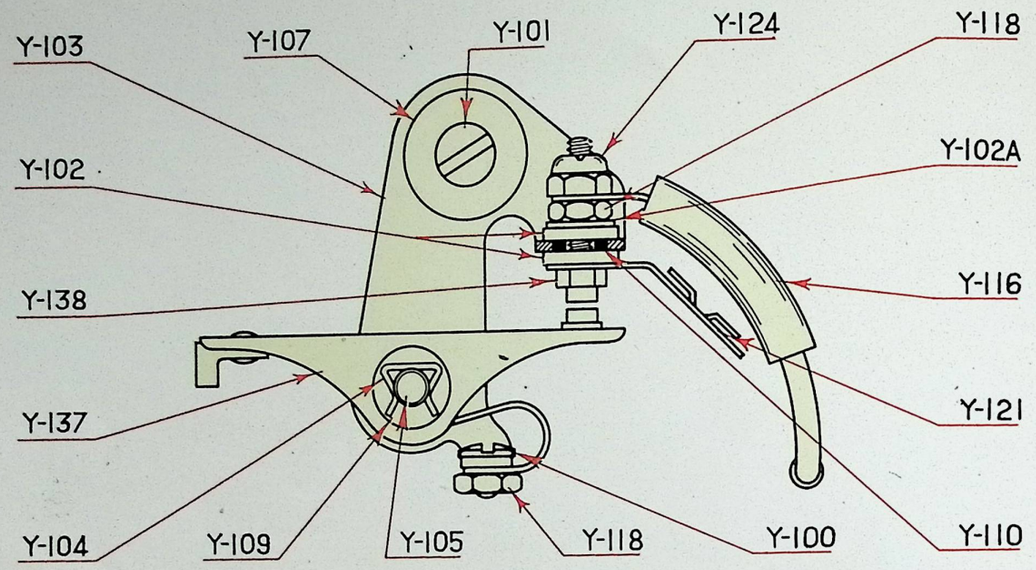
ARMATURE PLATE—FLYWHEEL SIDE

DRAWING NO. 6



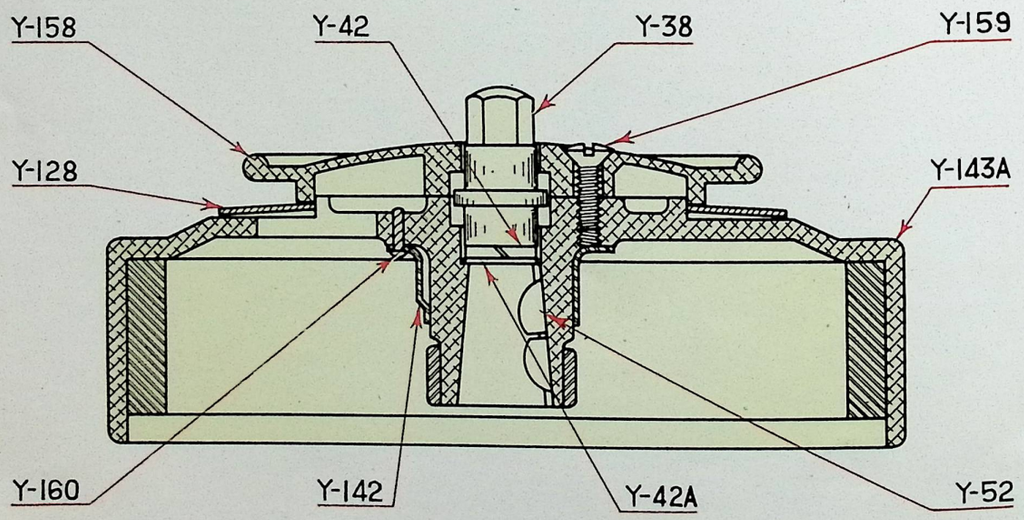
BREAKER POINTS—DETAIL ASSEMBLY

DRAWING NO. 7



FLYWHEEL—SECTIONAL ASSEMBLY

DRAWING NO. 8



BREAKER POINT ASSEMBLY PARTS

DRAWING NO. 7

*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-100	Screw for breaker spring	Brass	2	
Y-101	Screw for breaker plate	Brass	2	
Y-102	Insulation washer	Fibre	8	
Y-102A	Cutwasher	Brass	2	
Y-103	Breaker plate	Steel	2	
Y-104	Spring clip	Steel	2	
Y-105	Breaker post	Steel	2	
Y-107	Washer for Y-101	Steel	2	
Y-109	Washer for breaker post	Steel	2	
Y-110	Insulation bushing	Fibre	4	
Y-116	Tubing for cutout lead	Cotton	4	
Y-118	Nut for Y-100, Y-117 and Y-138	Brass	8	
Y-121	Terminal—condenser leads	Brass	2	
Y-124	Locknut—contact point and screw	Brass	2	
Y-137	Breaker arm and spring assembly	Steel	2	*Part of Y-138A
Y-138	Contact point and screw	Steel	2	*Part of Y-138A
Y-138A	Breaker points	Steel	2	Includes Y-137 and Y-138
Y-139	Feeler gauge	Steel	1	Not shown on drawing

B-77 B-77A B-71 B-70 B-90 B-81

FLYWHEEL ASSEMBLY PARTS

DRAWING NO. 8

B-82

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
Y-38	Nut for crankshaft	Steel	1	
Y-42	Lockwasher for Y-38	Steel	1	
Y-42A	Cutwasher for Y-42	Aluminum	1	
Y-52	Key for flywheel	Steel	2	
Y-128	Inspection hole cover	Aluminum	1	
Y-142	Cam	Steel	1	
Y-143A	Flywheel with cam	Alum. & Steel	1	
Y-158	Starter plate	Zamac	1	
Y-159	Screws for starter plate	Bronze	3	
Y-160	Screws for cam	Brass	3	

B-85 B-84 B-75

CARBURETOR PARTS

DRAWING NO. 9

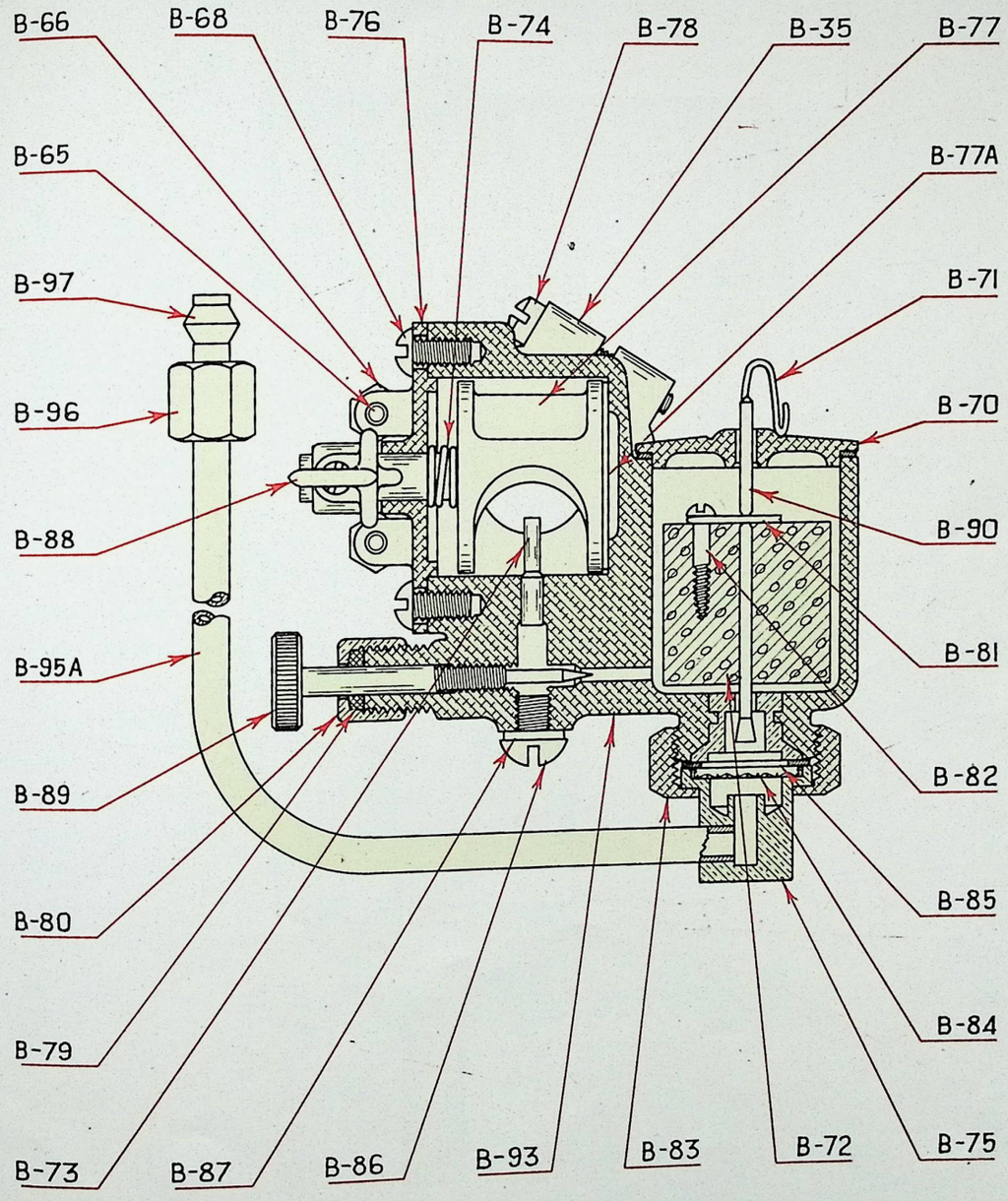
*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
B-92	CARBURETOR COMPLETE		1	Does not include B95A gas line
B-35	Clamp for carburetor	Aluminum	1	Includes 1 B-78 screw
B-65	Stop screw for control lever	Steel	2	*Part of B-94
B-66	Nut for B-65	Steel	2	*Part of B-94
B-68	Screw for valve cover	Steel	2	*Part of B-94
B-70	Cover for float	Aluminum	1	
B-71	Spring for float cover	Brass	1	
B-72	Float	Cork	1	*Part of B-91
B-73	Nozzle	Brass	1	*Part of B-93
B-74	Spring for B-77 valve	Steel	1	
B-75	Settling basin for strainer	Brass	1	*Part of B-95A
B-76	Cover for throttle valve	Aluminum	1	*Part of B-94
B-77	Throttle valve	Aluminum	1	
B-77A	Valve bearing disc	Brass	1	
B-78	Screw for carburetor clamp	Steel	1	*Part of B-35
B-79	Needle valve packing	Sym. 1103	1	
B-80	Stuffing nut for needle valve	Aluminum	1	
B-81	Cotter pin for float	Steel	1	*Part of B-91
B-82	Wood screw for float	Brass	1	*Part of B-91
B-83	Hexagon nut for strainer	Aluminum	1	*Part of B-95A
B-84	Screen for strainer	Brass	1	
B-85	Gasket for strainer		1	
B-86	Screw for carburetor cleanout	Steel	1	
B-87	Washer for B-86 screw	Fibre	1	
B-88	Control lever with set screw	Alum. & Steel	1	
B-89	Needle valve	Brass & Steel	1	
B-90	Float valve and pin	Steel	1	
B-91	Float assembly		1	Includes: 1 B-72 Float 1 B-81 Cotter pin 1 B-82 Wood screw
B-93	Carburetor body	Alum. & Brass	1	Includes 1 B-73 nozzle
B-94	Cover assembly for throttle valve		1	Includes: 2 B-65 Screws 2 B-66 Nuts 2 B-68 Screws 1 B-76 Cover
B-95A	Gas line, tank to carburetor, complete		1	Includes: 1 B-75 Settling basin 1 B-83 Hexagon nut 1 Y-169 Gas line tubing nut 1 Y-170 Tubing nut ferrule
Y-169	Gas line tubing nut	Brass	1	
Y-170	Gas line tubing nut ferrule	Brass	1	

Y-103 Y-102 Y-138 Y-137 Y-104 Y-158 Y-128 Y-160

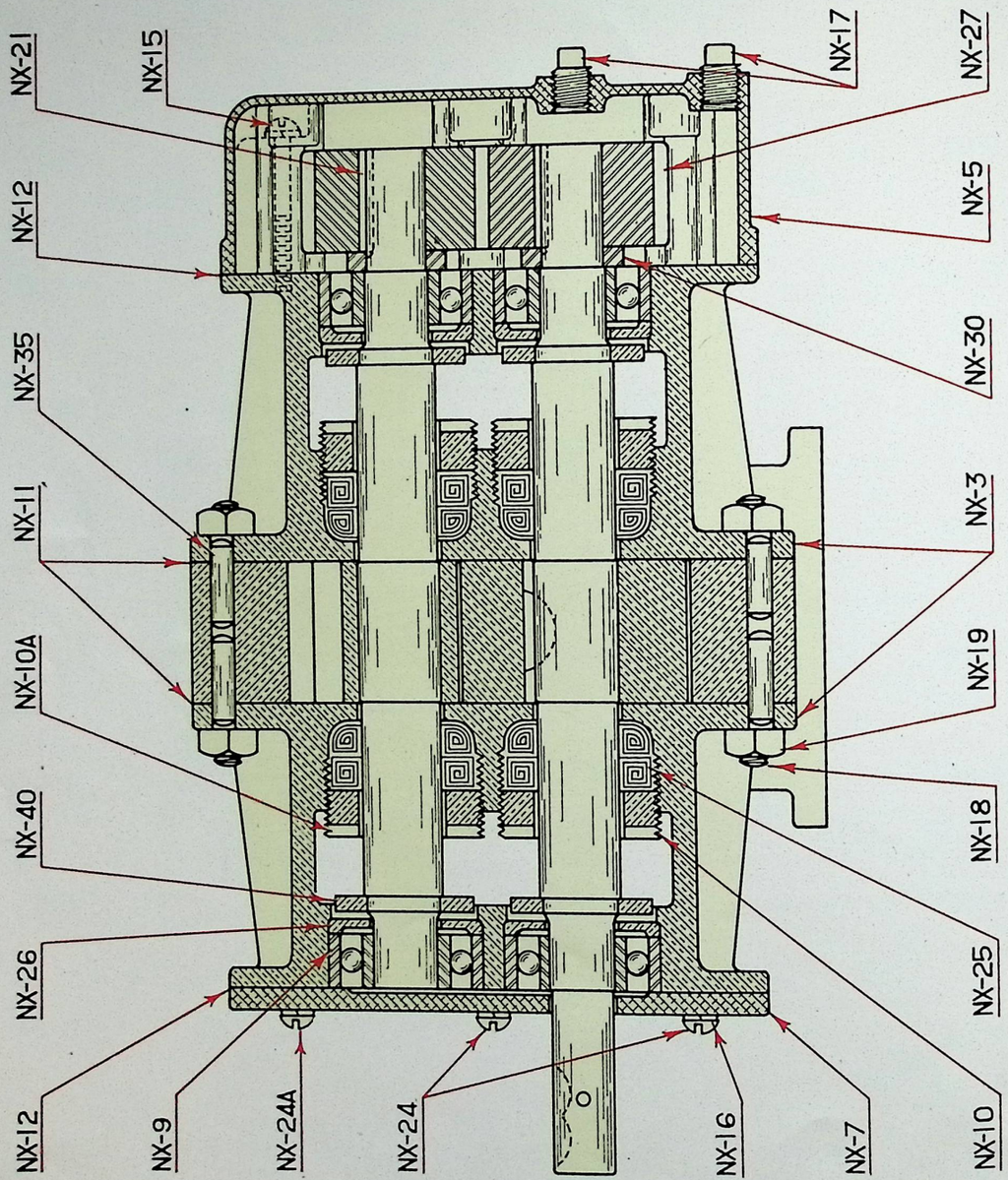
CARBURETOR—SECTIONAL ASSEMBLY

DRAWING NO. 9



PUMP—SECTIONAL ASSEMBLY—SIDE

DRAWING NO. 10

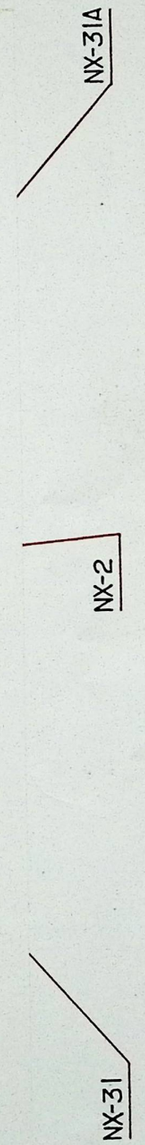


PUMP PARTS

DRAWING NO. 10

*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
NX-1	PUMP COMPLETE		1	
NX-3	Pump body	Bronze	2	
NX-5	Gear case	Aluminum	1	
NX-7	End cover	Aluminum	1	
NX-9	Ball bearing	Steel	4	
NX-10	Packing nut—right	Bronze	2	
NX-10A	Packing nut—left	Bronze	2	
NX-11	Gasket—pump body		2	
NX-12	Gasket—gear case and end cover		2	
NX-15	Screw for gear case	Brass	6	
NX-16	Lockwasher for NX-15, NX-24 and NX-24A	Steel	12	
NX-17	Plug for gear case	Bronze	2	
NX-18	Stud—pump body to cylinder	Steel	8	
NX-19	Nut for NX-18	Bronze	16	
NX-21	Pilot gear keys	Steel	2	
NX-24	Screws—end cover—short	Brass	4	
NX-24A	Screws—end cover—long	Brass	2	
NX-25	Packing, braided type	Sym. 1103	8	Sold in sets of 8 only
NX-25A	Lantern ring	Brass	4	Used with leather packing
NX-25B	Packing, leather type	Leather	8	Sold in sets of 8 only
NX-25C	Adapter ring	Brass	4	Used with leather packing
NX-26	Bearing retainer	Bronze	4	
NX-27	Pilot gears	Steel	2	
NX-30	Spacer for pilot gears	Steel	2	
NX-35	Dowel pin	Steel	4	
NX-40	Flinger	Brass	4	



PUMP PARTS

DRAWING NO. 11

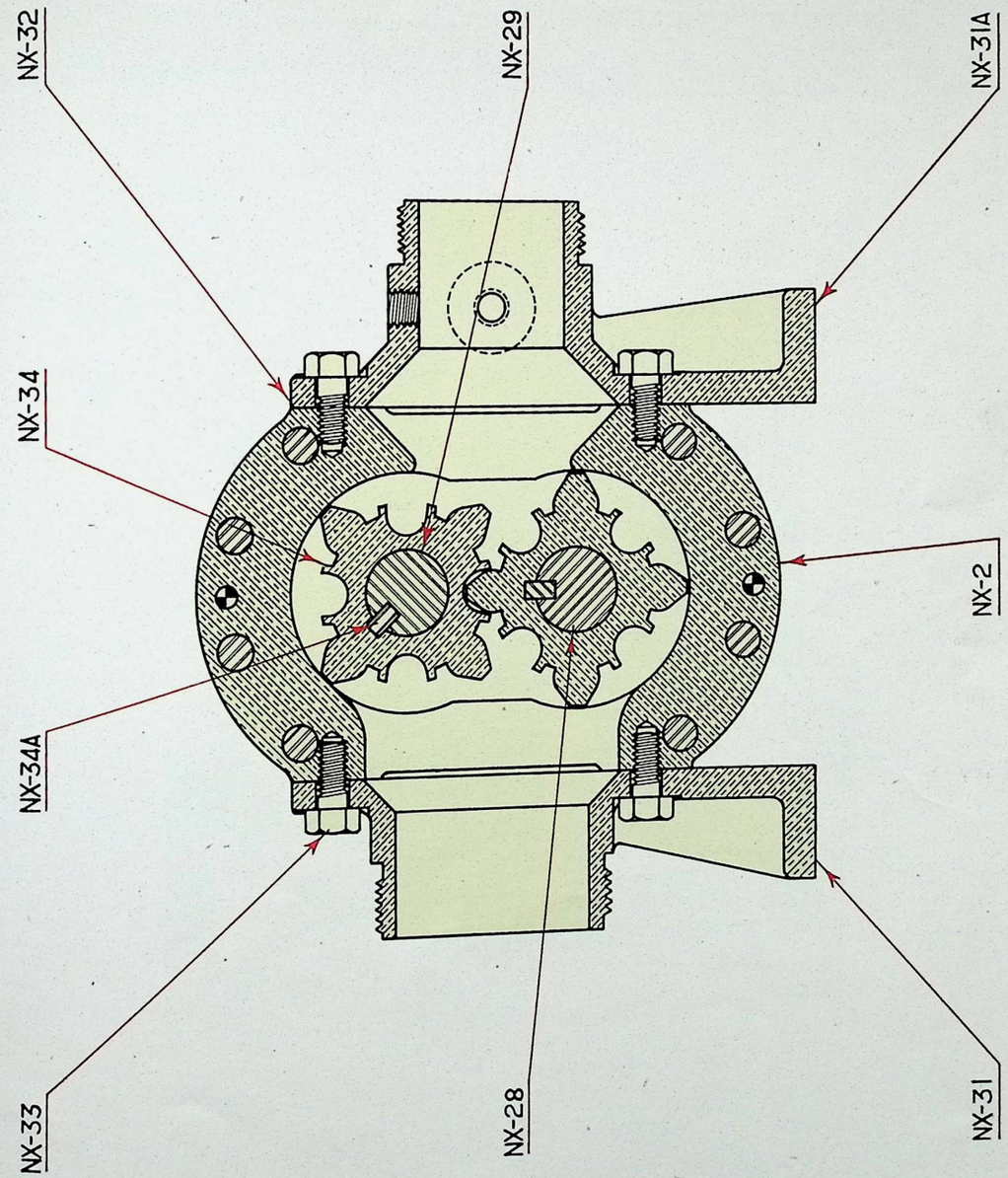
*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
NX-6	IMPELLER ASSEMBLY COMPLETE		1	Includes: 1 NX-28A Shaft and impeller 1 NX-29A Shaft and impeller 2 NX-27 Gears 1 NX-2 Cylinder
NX-2	Cylinder	Bronze	1	
NX-2A	Dowel pin—cylinder to legs	Brass	4	Not shown on drawing
NX-28	Shaft—long	K-Monel	1	*Part of NX-28A
NX-28A	Shaft—long—with impeller	K-Monel & Bronze	1	
NX-29	Shaft—short	K-Monel	1	*Part of NX-29A
NX-29A	Shaft—short—with impeller	K-Monel & Bronze	1	
NX-31	Leg—suction side of pump	Bronze	1	
NX-31A	Leg—discharge side of pump	Bronze	1	
NX-32	Gasket—suction and discharge flange		2	
NX-33	Screw—suction and discharge flange	Bronze	20	
NX-34	Impellers	Bronze	2	*Part of NX-28A and NX-29A
NX-34A	Key	Steel	2	
NX-13	Grease cup	Brass	2	Not shown on drawing
NX-14	Grease cup extension	Brass	4	Not shown on drawing For ball bearing lubrication
NX-14A	Grease cup extension with check valve	Brass	2	Not shown on drawing For leather packing lubrication
NX-20	Packing gland wrench	Steel	1	Not shown on drawing
NX-59	GASKETS—complete set for pump—includes: 2 NX-11 Pump body gaskets 2 NX-12 Gear cover gaskets 2 NX-32 Suction and discharge flange gaskets			

NX-21 NX-12 NX-35 NX-11 NX-10A NX-40 NX-26 NX-12

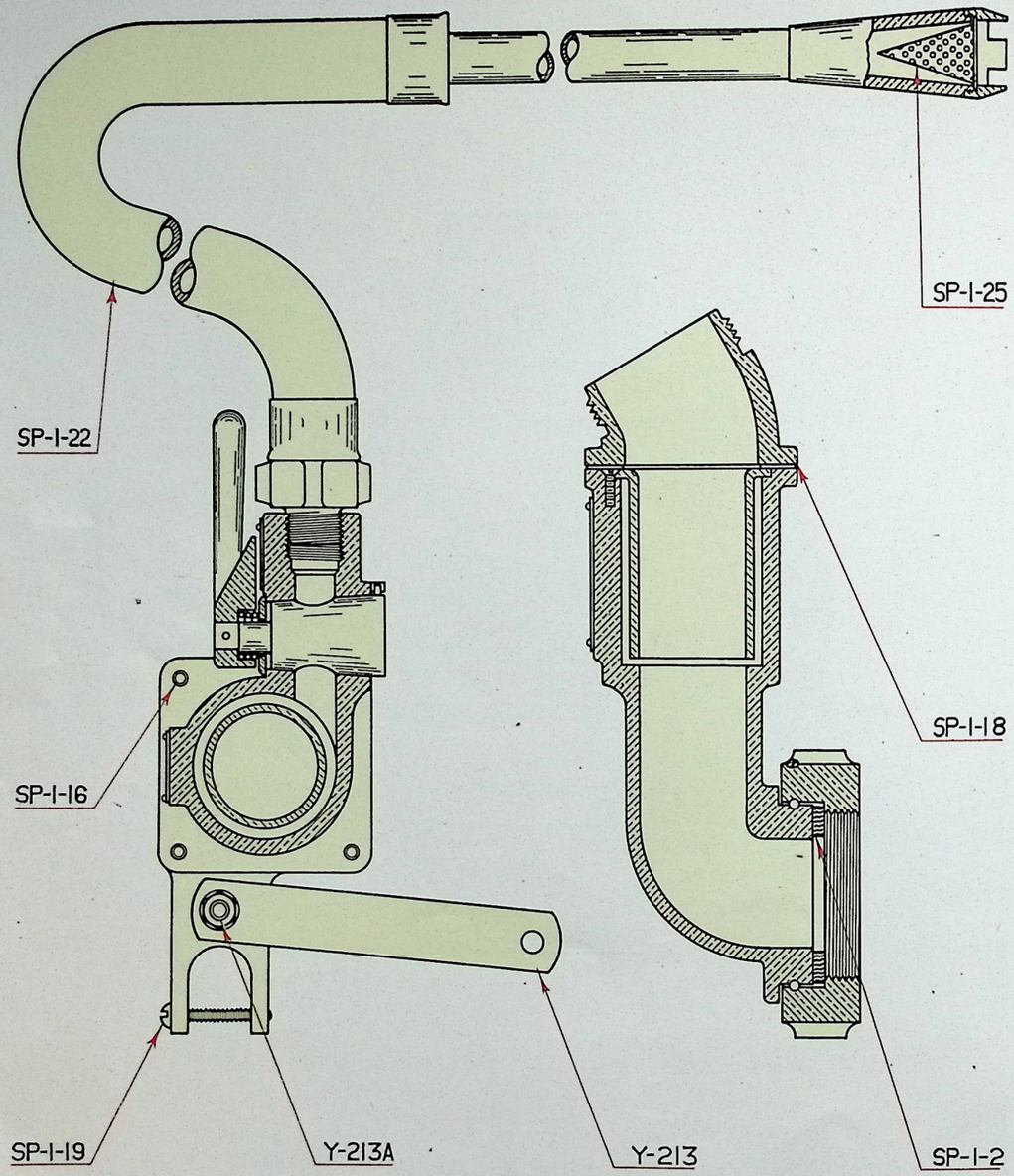
PUMP—SECTIONAL ASSEMBLY—END

DRAWING NO. 11



SP-1 SUCTION PROPORTIONER

DRAWING NO. 12

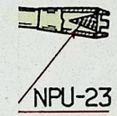


SP-1 SUCTION PROPORTIONER PARTS

DRAWING NO. 12

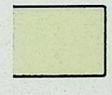
*NOT SOLD SEPARATELY

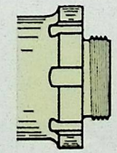
Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
SP-1-2	2" Swivel gasket	Rubber	1	
SP-1-16	Screw—flange to body	Bronze	4	
SP-1-18	Inlet flange and gasket	Bronze	1	
SP-1-19	Locking screw	Brass	1	
SP-1-22	Pick-up tube complete	Rubber & Brass	1	
SP-1-25	Pick-up tube strainer	Brass	1	
Y-213	Proportioner brace	Steel	1	
Y-213A	Screw, nut and lockwasher for Y-213	Steel	1	



NX-43B

NX-43D





NPU FOAM NOZZLE PARTS

DRAWING NO. 13

*NOT SOLD SEPARATELY

Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
NPU-2	1½" Rubber washer	Rubber	2	
NPU-5	Inlet strainer	Brass	1	
NPU-16	Chain assembly	Steel	1	
NPU-20	Pick-up tube complete	Rubber & Brass	1	
NPU 23	Pick-up tube strainer	Brass	1	

SP-I-22

MISCELLANEOUS

DRAWING NO. 14

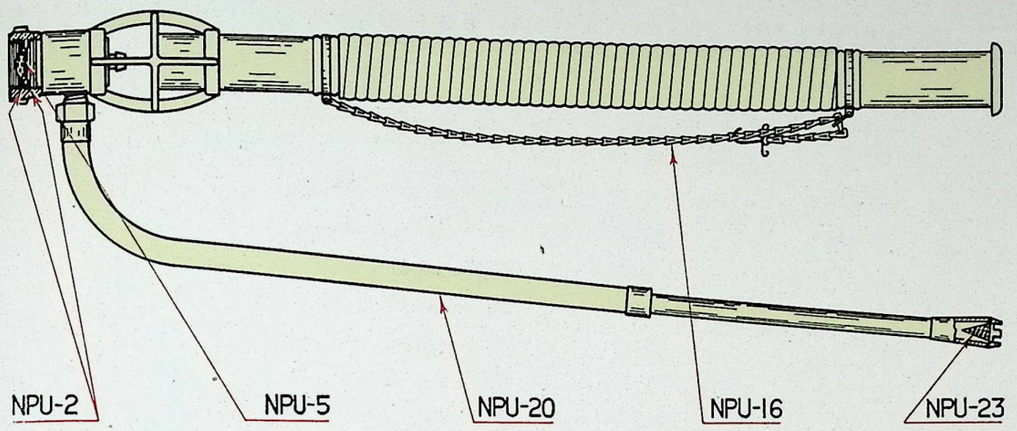
Part No.	NAME OF PART	MATERIAL	No. Req'd. Per Unit	NOTES
NX-43	Suction strainer complete	Bronze & Cop'r	1	
NX-43A	Suction strainer body	Bronze	1	
NX-43B	Suction strainer cover plate	Bronze	1	
NX-43C	Suction strainer screen	Copper	1	
NX-43D	Suction strainer rivets		4	
NX-50	Suction hose		2	
NX-51	Exhaust hose		1	
NX-52	1½" hose gasket			
NX-53	2" hose gasket			
NX-54	Spare parts box			
NX-55	Manual			
NX-60	Gaskets— complete set for pumper			

SP-I-16

SP-I-19

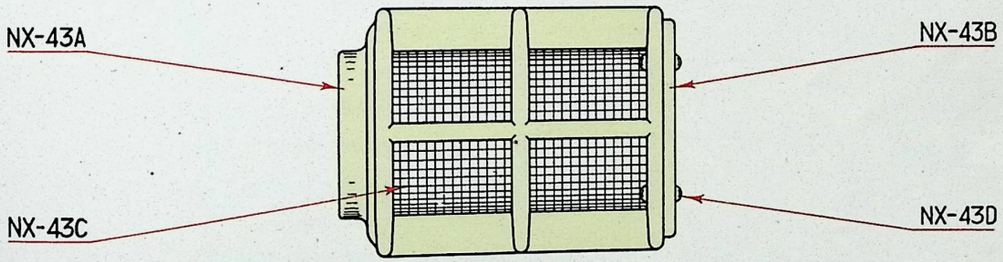
NPU MECHANICAL FOAM NOZZLE

DRAWING NO. 13

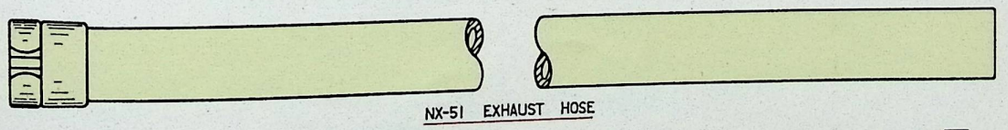


MISCELLANEOUS GROUP

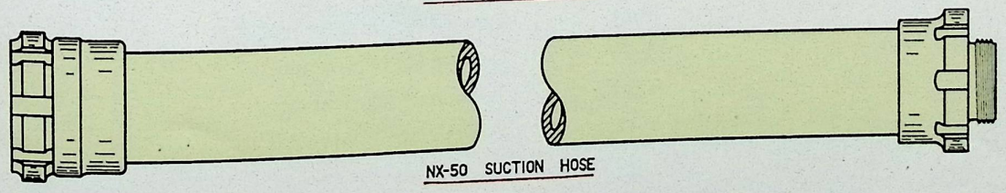
DRAWING NO. 14



NX-43 SUCTION STRAINER



NX-51 EXHAUST HOSE



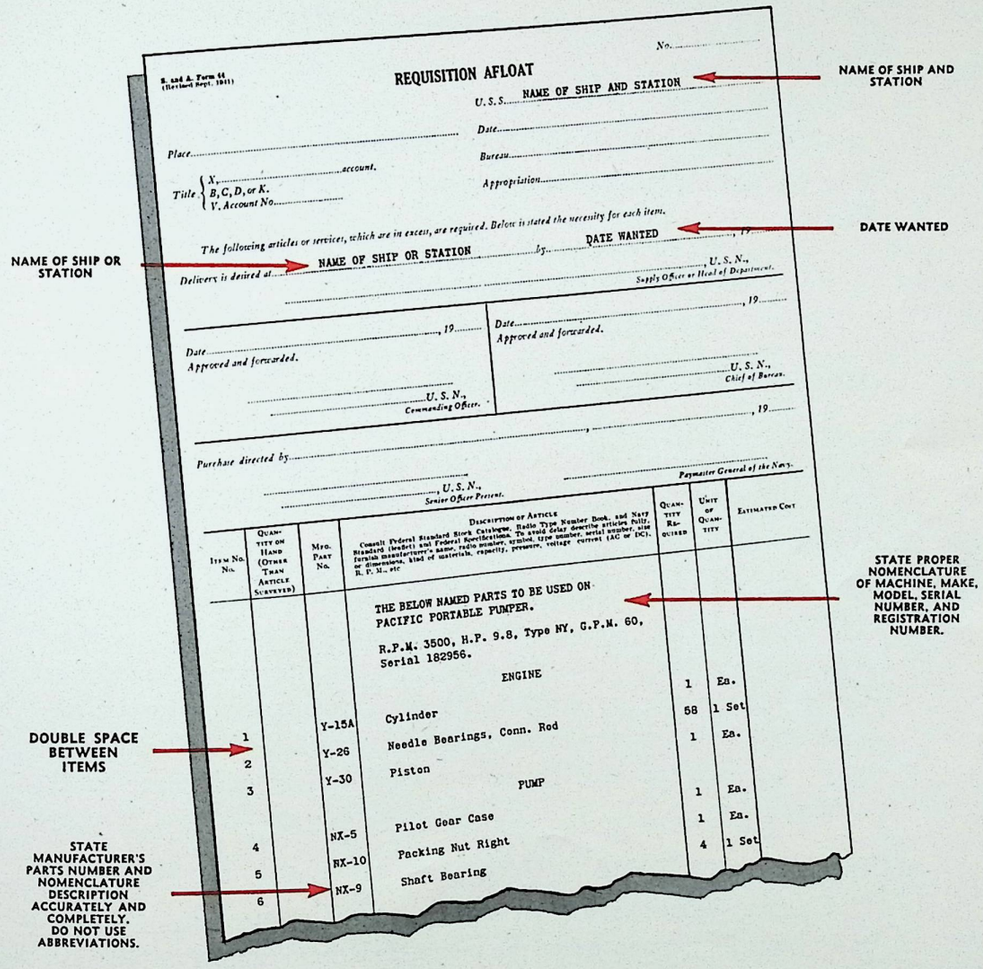
NX-50 SUCTION HOSE

SPARE PARTS AND TOOLS

INCLUDED IN SPARE PARTS BOX FOR "NY" PUMPER

QUANTITY	PART NO.	NAME OF PART OR ASSEMBLY
3	Y-7	Roller bearing retainers
1	Y-9	Ring for bearing race
2	Y-10	Roller bearing retainers, magneto end
2	Y-12	Shims, .003
2	Y-13	Shims, .010
48	Y-8	Roller bearings
4	NX-9	Ball bearings
58	Y-26	Needle bearings
1	NX-6	Impeller assembly complete, consisting of: 1 NX-28A Shaft, long, with impeller 1 NX-29A Shaft, short, with impeller 2 NX-27 Pilot gears 1 NX-2 Cylinder
12	Y-157	Spark plugs
8	NX-25	Shaft packing
1	Y-4	Gasket, end cover to crankcase
1	Y-20	Gasket, cylinder base
2	Y-22	Gaskets, exhaust manifold
1	Y-29	Gasket, base to crankcase
1	Y-36	Gasket, cylinder to muffler
1	B-92	Carburetor complete
2	Y-137	Breaker arms and springs
2	Y-138	Contact points and screws
1	Y-148	Ignition coil
2	Y-154	Condensers
2	B-84	Screens for carburetor
2	B-85	Gaskets for carburetor
1	NX-20	Pump packing wrench
1	Y-139	Feeler gage

SAMPLE REQUISITION


NAME OF SHIP AND STATION
DATE WANTED
NAME OF SHIP OR STATION
DOUBLE SPACE BETWEEN ITEMS
STATE MANUFACTURER'S PARTS NUMBER AND NOMENCLATURE DESCRIPTION ACCURATELY AND COMPLETELY. DO NOT USE ABBREVIATIONS.
STATE PROPER NOMENCLATURE OF MACHINE, MAKE, MODEL, SERIAL NUMBER, AND REGISTRATION NUMBER.
REQUISITION AFLOAT
U. S. S. NAME OF SHIP AND STATION
THE BELOW NAMED PARTS TO BE USED ON PACIFIC PORTABLE PUMPER.
R.P.M. 3500, H.P. 9.8, Type NY, G.P.M. 60, Serial 182956.
ENGINE
PUMP
Y-15A Cylinder
Y-26 Needle Bearings, Conn. Rod
Y-30 Piston
NX-5 Pilot Gear Case
NX-10 Packing Nut Right
NX-9 Shaft Bearing

The above requisition form is used for ships' orders to a Naval Supply Depot.

PUMPER CHANGES—REPLACEMENT PARTS

Conditions and mechanical improvements have caused changes to be made in parts and design. The following is a list of the more important changes that have been made. New style parts are always furnished for replacement.

ELIMINATION OF 3-WAY COCK IN GAS LINE

Part No. B-95A, gas line tank to carburetor, replaces the following parts:

Y-230A—3-way cock
Y-231—Gas line, tank to 3-way cock
B-95—Gas line, cock to carburetor

ELIMINATION OF COCK IN COOLING WATER LINE

Part No. Y-163A, restricted flow connector, replaces Y-163 cock. When installing a connector in place of the cock, a longer Y-162 water tube must be used. This is furnished with the Y-163A connector.

REDESIGNED CRANKCASE END COVER ASSEMBLY

The redesigned crankcase end cover assembly, Part Y-3, includes a leather type oil seal. This type of seal has been developed to reduce the oil leakage into the magneto. This new style is always furnished with orders calling for a crankcase end cover assembly. The necessary parts are included to convert an old style end cover to a new one.

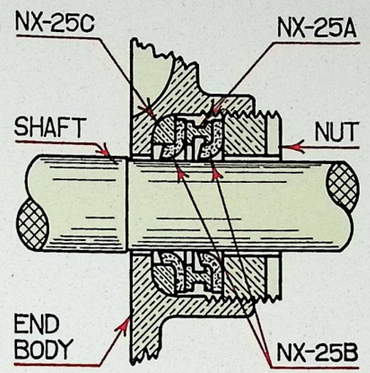
REDESIGNED GAS TANK

The new style gas tank, Part Y-220, is suspended from the guard rail rather than mounted on the pump. The drain tube, Y-229B, has been eliminated. The tank has been reinforced on the inside with 2 baffle plates. Old style tanks can readily be replaced with the new style.

LEATHER TYPE PUMP PACKING

Pumps are now being equipped, by the manufacturer, with leather type packing. Each packing gland assembly consists of:

1 NX 25C Adapter ring
1 NX-25A Lantern ring
2 NX-25B Packing leathers
1 R. or L. Packing nut



This leather packing is lubricated by means of grease cups installed on the suction side of the pump. These cups should be filled with medium weight, water-proof grease and turned down one full turn every four hours of operation. If water-proof grease is not available any medium weight grease is satisfactory.

Pumpers having braided type packing can be converted to leather packing by use of adapter rings and lantern rings. Likewise, pumps furnished with leather packing can be converted to braided packing by removing the adapter and lantern rings.

Leather packing is lubricated in pumps not equipped with grease cups by backing off packing nuts, leather packing, and lantern rings, and then applying grease. Worn leather packing, that permits excess water leakage, must be replaced as it is not adjustable by the tightening of the packing nuts.

GAUGE MOUNTED ON BRACKET

The Y-202 gauge, formerly mounted on the base, is now mounted on a Y-203 gauge bracket and connected to the pump with a Y-168A tube. The bracket is secured to the muffler of the engine. Mounting the gauge in this new position permits the water to drain from the gauge when the pumper is not in operation.

4-14M-45